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THE LAKE ERIE OUTLET DAM

BUFFALO, June 20.—I see they are talking of the Erie-Niagara dam again, word coming over from the Canadian side as though the two governments were about to take some decisive action in the matter. I had supposed that the whole thing had blown over as something of so very doubtful utility that nobody was willing to be responsible for it. It is well at the outset that the government authorities should fall to asking each other if there is likely to be any damages to meet from flooded shores and the like, for Buffalo long ago came to the conclusion that there was too much low land down close to lake level here to make it safe to raise the water of the lake.

But, laying this question aside for the moment, where is the utility of such an undertaking? Are not our vessels large enough now? If they are not it will be quite easy, as things are going now, to add a few hundred feet more to the length of either old or new vessels and the thing is done, with no more draft whatever! Besides it would be useless to make an effort to deepen dock sidings and inter-lake channels in any such way. The fleet will always be built so that there will be dragging on the bottom at low water times. Otherwise there would be small use for dry-docks most of the time and they must be encouraged.

Then it remains to be found that any engineer is prepared to stake his reputation on there being any appreciable raising of levels above Lake Erie by a dam at Buffalo. Maybe something of the sort would happen, probably the effect would be small. Surely the lake levels would be much more uncertain than they are now and the expense—well, no matter about that, the country is rich. I suppose we would have the experience and engineers would then know what the effect of such a dam would be and they might get some business out of it. Seriously, it usually pays to buy experience if we have the funds to meet the cost, but there may be reasons sometimes for hesitating over this or that project.

It is pretty plain that the district north of the proposed dam will not relish any sort of barrier between it and Lake Erie and the tonnage of the Tonawandas and Black Rock is large and growing. I was watching a lumber tow on its way down the Niagara river only a day or two ago. As it passed through the swift current just above the International bridge the last barge began to gain on the others and the tow line slacked apparently to the bottom. Someone remarked that it would be easy to tangle the tow up should a squall come up. The current, with the wind down the river runs up to 11 miles an hour at that point, how fast would it run with a dam cutting down the mouth of the lake to a small part of what it is now? Of course the building of a ship canal down from Lake Erie to Lower Black Rock would put a different face to this part of the problem, but that is by no means a certainty yet. At the same time there are doubtless many tows that would still go down the open river after the canal is built, if there is a chance.

As to the injury done to low lands and low docks there can be no doubt. It would be very great and if there is anything the Government can do that would lay it open to claims this seems foremost, being the result of voluntary proceedings the effect of which is well foreseen by everyone. The entire valley of Buffalo river for several miles from its mouth is inundated every year now and the dam would have to be built below the mouth of this river. Small use of the agitation in Buffalo looking towards the abatement of these floods by deepening and straightening Buffalo river.

Then comes up the question of the form of the dam and at once there are many advocates of a structure that could be shifted about to meet the requirements of general high or low water or local floods. If this could be done and the lake level be controlled as air in a room is by a thermostat what an achievement! But nobody believes such a thing even remotely possible. With a dam two feet high one minute and ten the next there would be no relief from the rise or fall of half a dozen feet that takes place in a few moments in Buffalo or Toledo with a sudden change of the wind.

Then it would be a very rash undertaking to make the Niagara responsible in any way for these fluctuations. This river is now less subject to floods than any other river, but with a movable dam it would become the worst torrent in existence. It is plain that the two nations contemplating such a step will do well to look the matter over very thoroughly before they do anything about it. After they have I do not think there will be much danger of their building the dam.

JOHN CHAMBERLIN.

Hong Kong has hitherto been spoken of as the third shipping port in the world. The figures for 1904 are not yet available, but those for 1903 show that it is not only far ahead of New York, the third largest, but so good a second that there is every probability of its soon being first.

The official returns of vessels entered at the five greatest ports in 1903 are:

	Tons.
London	10,958,739
Hong Kong	10,783,502
New York	9,371,545
Antwerp	9,039,313
Hamburg (excluding Cuxhaven)	8,244,660

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TRIAL OF BRITISH SCOUT FORWARD

Three of the eight scout ships now being built for the British navy have completed their trials and in each case the guaranteed speed of 25 knots has been exceeded by quite a quarter of a mile per hour. In the course of a full-speed test of eight hours' duration the Forward, built by the Fairfield Ship Building & Engineering Co., Govan, Glasgow, maintained a mean speed of 25.286 knots on six runs over the measured mile on the Clyde, while the engines were indicating 1500 H. P. less than the designed power. Running at 210 revolutions, 16,500 indicated H. P. was anticipated; on the measured mile trial the mean revolutions were 211.8, and the power 14,995 indicated H. P., the links on the twin engines being set to cut off at 58 and 57 per cent of the stroke respectively. Some explanation for the higher ratio of speed to power than was aimed at for the higher ratio of speed to power than was aimed at in the design is found in the fact that the cruising speed was realized very economically as regards engine power and coal consumption, and that therefore a smaller load of fuel satisfied the condition of the contract, which required that the vessel should, on the full-power trial, carry coal to enable her to steam for 1500 miles at 10 to 12 knots. The weights, too, evidently came out rather less than was anticipated, and thus the vessel met all the conditions for the full-speed trial on a displacement of 2,790 tons, and a mean draught of 13 ft. 10½ in. instead of the estimated displacement of 2,850 tons on a draught of 14 ft. 2 in. But apart from these facts, the speed and power results indicate a high Admiralty coefficient of fineness, and a satisfactory efficiency in machinery and propellers. These latter, with three manganese-bronze blades, made detachable, have a diameter of 12 ft., and a pitch of 14 ft. 6 in.

The Forward has a length between perpendiculars of 365 ft. and a beam of 38 ft. 9 in. She has a considerable rise of floor from keel to bilge, approximating to the spinning-top section, and, in view of recent controversy, has full rather than hollow lines. The wave-line was favorable to rapid steaming. She has a moderate freeboard, with a high forecastle and a half poop, of great advantage for sea steaming. The half poop is peculiar to the two Fairfield boats. Another feature which distinguishes the Forward from some of the other scouts is that instead of having a protective deck, she has 2-in. K. N. C. nickel steel on the broadside from a depth of 2 ft. 6 in. under the load-line to the top of the side plating, and extending along the machinery and boiler compartments, which is equal to 127 ft. of the length of the ship. The total depth of the plating is 11 ft. 3 in. Forward and aft there is a bulkhead of similar thickness, so that the boilers and engines are enclosed within a box with 2-in. nickel-steel walls. The bulkheads dividing the boiler space into three compartments have no openings; there is the usual door in the longitudinal dividing wall between the engine-rooms. The ship is lightly armed, having ten 12-pounder and eight 3-pounder quick-firing guns, with two tubes on deck for firing Whitehead torpedoes. Although these vessels may successfully engage torpedo craft, their main function will be not to fight, but to scout in the danger zone and bring information. They lie low in the water, and their pole masts serve only for signalling and for wireless telegraphy.

The machinery, which is in duplicate for twin-screw propulsion, is of special interest, in that it may be said to occupy an intermediate position between those forms which have hitherto been associated with torpedo-boat destroyers and cruisers respectively; thus the engines, although of the power of cruiser engines, are in general features of "destroyer" design, the cylinders being supported entirely on turned forged steel columns. The bed-plates are of somewhat novel design, and consist of a series of separate cast-steel transverse girders, each transverse girder being provided with one crank-shaft bearing. These cross-girders, or bearing-frames, are flat on the underside throughout their whole length, are six in number for each engine, and are connected at their ends by short distance-pieces of cast steel. The engines, which are of the type known as four-cylinder triple-expansion, are balanced on the Yarrow, Schlick, and Tweedy system, with the low-pressure cylinders on the outside centre line, and the low-pressure moving parts are of considerably lighter scantlings than those of the high and intermediate-pressure cylinders, as is the common practice with engines of this class. The valve gear is of the double eccentric type, the quadrant links being of the double-bar type, and all joints are made adjustable. The slide-valves for the high-pressure and intermediate cylinders are of piston form, and the low-pressure valves are of the flat type with relief rings.

The cylinders, which are all independent castings, and are not fitted with liners, are of the following diameters respectively: High pressure, 31½ in.; intermediate pressure 50½ in.; and low pressure (of which there are two to each engine), 57 in.; the stroke in all cases is 2 ft. 6 in. The pistons for the high pressure and intermediate cylinders are of forged steel, and the low-pressure pistons are of cast steel. The covers of all the cylinders are of cast steel. The shafting is hollow, the crank-shafts being 13½ in. external diameter and 6½ in. internal diameter, and the propeller shafts 14½ in. outside diameter, with an internal hole 5 in. in diameter.

The condensers are of rolled brass, built up and riveted together. One condenser is provided for each engine, and the total condensing surface for the ship is 14,022 square feet. Circulating water is supplied to these condensers by 17-in. centrifugal pumps. The air-pumps are independently driven, of the twin direct-driven type, a double pump being provided for each set of engines.

Steam is supplied by twelve boilers of modified Thornycroft type, placed in three boiler compartments, and fired from six stokeholds. The aggregate tube surface is 42,960 square feet, and the total grate surface is 752.4 square feet. The working pressure is 260 lb. per square inch.

TABLE I.—RESULTS OF 96 HOURS' COAL CONSUMPTION TRIAL OF H. M. S. "FORWARD," ON MARCH 28, 29, 30 AND 31, 1905, AT 10.436 KNOTS' SPEED.

		Starboard	Port
Mean steam in boilers		142 lb.	142 lb.
Mean steam at engines (high-pressure receiver)		49.8 lb.	44.8 lb.
Mean air-pressure in stokeholds		nil	nil
Mean cut-off in high-pressure cylinder		44 p. c.	43 p. c.
Mean vacuum		24 in.	24.8 in.
Mean revolutions per minute		80.32	80.53
Mean pressure in cylinders	High	17.1 lb.	15.2 lb.
	Intermediate	5.7 lb.	4.68 lb.
	Low, forward	1.87 lb	2.64 lb.
	Low, aft	1.76 lb.	2.69 lb.
Indicated horse-power	High	162	146
	Intermediate	139	113
	Low, forward	58	82
	Low, aft	55	84
Total indicated horse-power		414	425
Gross total indicated horse-power		839	
Coal per indicated horse-power per hour		2.661 lb.	
Water loss per 1000 indicated horse-power per 24 hours		4.13 tons	
Mean indicated horse-power on miles		829	
Speed—mean of six runs on course		10.666 knots	
Speed—mean of 96 hours		10.436 knots	

The conditions of contract required that the Forward should maintain for eight hours a speed of 25 knots while carrying in her bunkers sufficient coal to enable her to steam 1,500 nautical miles at from 10 to 12 knots; the amount was to be arrived at by taking the rate of coal consumption on a 96 hours' test. The exact speed to be made on this long trial was left to the discretion of the contractors, who chose the most economical rate. The Forward averaged throughout the 96 hours, as shown in Table I., a mean of 10.436 knots,

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and the mean power was 839 indicated H. P., with the twin engines cutting off at 44 and 43 per cent of the stroke respectively, and making 80.32 and 80.53 revolutions. On each morning of this 96 hours' trial the vessel returned to the measured mile at Skelmorlie to make six runs; the average speed on these was found to be 10.666 knots for 829 indicated H. P. realized for 82.2 and 82.9 revolutions respectively by the twin engines. The steam results are as follows:

The coal consumption worked out at 2.661 lbs. per indicated H. P. per hour; or, as near as may be, to 1 ton per hour. At this cruising speed, therefore, the vessel steams 10½ miles per ton of coal. The vessels have capacity for carrying 500 tons of coal, so that the high economy realized will enable 5,000 miles to be run at 10½ miles, which is much greater than was anticipated when the order for the ships was placed. As the Forward has realized her full speed for a low power, her radius of action at 25 knots will be correspondingly increased, and thus she will be the more serviceable in war times. On the full-speed trial the supply to enable her to go 1,500 miles at 10½ knots speed was exactly 145¼ tons. This was the load carried when she commenced her eight hours' trial on the 11th inst. The displacement was then 2,790 tons, the draught forward being 13 ft., and aft, 14 ft. 9 in., giving a mean of 13 ft. 10½ in. The vessel was required to make six runs over the measured mile within one hour and a half of the commencement of the eight hours' trial, and the results are as follows:

SIX RUNS ON THE MEASURED MILE AT FULL SPEED.

Run	Revolutions	Speed	Indicated Horse-Power
		knots	
1	213.5	25.568	15,121
2	213.5	25.245	15,301
3	212.5	25.532	14,970
4	211.0	25.070	14,806
5	210.0	25.210	14,498
6	213.0	25.281	15,277
Mean	211.8	25.286	14,995

These results were attained with the engines cutting off at 58 per cent and 57 per cent of the stroke respectively. The boilers were steaming easily, the air pressure in the stokehold being 1½ in., as shown in the first column of Table II., which sets out the mean results from the machinery during these six runs. The second column of the table gives the results for the subsequent 6½ hours of the test.

TABLE II.—RESULTS OF FULL-POWER EIGHT-HOURS' TRIAL OF H. M. S. "FORWARD," MAY 11, 1905.

	Mean of Six Runs on Measured Mile.		Mean of Subsequent 6¼ Hours of Trial.	
	Star board.	Port.	Star board.	Port.
Mean steam in boilers	250 lbs.		250 lbs.	
Mean steam at engines (high-pressure receiver)	227 lb.	234 lb.	227 lb.	234 lb.
Mean air-pressure in stokeholds	1.5 in.	1.5 in.	1.8 in.	1.8 in.
Mean cut-off in high-pressure cylinder	58 p. c.	57 p. c.	59 p. c.	59 p. c.
Mean vacuum	25.3 in.	24.8 in.	25.2 in.	24.8 in.
Mean revolutions per minute	211.6	212	211.7	209.8
Mean pressure in cylinders: High	109 lb.	111.3 lb.	112.1 lb.	112.3 lb
Intermediate	34.5 lb.	34.9 lb.	34 lb.	35.3 lb
Low, forward	14.83 lb.	16 lb.	15.1 lb.	15.8 lb
Low, aft	14.85 lb.	15.3 lb.	15.0 lb.	15.54 lb
Indicated horse-power: High	2727	2792	2803	2782
Intermediate	2224	2248	2186	2247
Low, forward	1217	1313	1235	1282
Low aft	1218	1256	1226	1261
Total indicated horse-power	7386	7609	7450	7572
Gross total indicated horse-power	14,995		15,022	
Total water loss for all 8 hours	13.6 tons			
Speed	25.286 knots			
Loss of water per 1000 indicated horse-power per 24 hrs.	2..71 tons			

It will be noted that the engines in the subsequent 6½ hours of the trial averaged over 210 revolutions, so that the speed was well over 25 knots. The machinery worked satisfactorily, while the engine-room was more comfortable than is usual with high-speed machinery. From first to last the performance was most favorable. After the trial various other tests as to the manoeuvring capabilities of the ship were carried out, and the vessel returned on the 12th inst. to Fairfield, to be completed for commission, which will take about two months. The sister-ship—the Foresight—will leave the same works shortly for speed trials.

LIVERPOOL SHIPPING LETTER

Liverpool, June 12.—Some interesting particulars are given in a booklet just issued by the recently formed Union of International Sailing Shipowners. The preface of the publication states that the union was formed in May, 1904, as the result of a conference of British, French and German owners held in Paris in December, 1903, to consider the unsatisfactory state of the sailing-ship business. It has to do only with vessels of 1,000 tons net register and upwards, and the control of the union is in the hands of an international committee, the members of which are appointed by the various nationalities in agreed on proportions. Although it is obvious that much good work might be done in many directions by such an international association, the only object of the union for the present is the binding together of sailing ship owners not to accept less than certain agreed on rates of freight for the principal homeward voyages in which sailing ships engage, and members of the union are bound under a penalty not to charter their vessels at a lower rate than the minimum prescribed by the committee of the union for any particular voyage. The intention of the union is not to push freights to such an extent as to oppress shippers or check business, but to prevent the ruinous competition which had come into the business and reduced freights to such an extent that they could not possibly pay expenses, and in many cases were leaving heavy losses to owners. The union was originally started on the basis of not less than 75 percent of the British, French and German tonnage interest being included, but up to the present the percentage has steadily risen to 87 percent.

The Orient-Pacific Line has had built a motor launch for the steamship Ophir, to be used in conjunction with the two steam pinnaces in conveying passengers to and from the ship at places visited by that vessel during her season of pleasure cruises to Norwegian Fiords. The launch has comfortable accommodation for about forty passengers. The motor is of the Gardner type, constructed to run with ordinary paraffin oil 15 brake horsepower. The launch is 35 ft. long, and has a speed of about 8 knots. The motor, reversing gear, and steering wheel are placed in the middle of the boat between steel watertight bulkheads, the use of wood in this compartment being entirely avoided.

The annual meeting of the Suez Canal Company held on Tuesday last, was remarkable in that there was a total absence of opposition by the dissatisfied shareholders who have been airing their alleged grievances in the press. Not even a voice was raised to criticise the decision of the board not to distribute in dividend the whole of the profits realized in 1904, and the reserving for future eventualities a sum of 5,000,000 francs. But the president hesitated not to make some observations on the criticisms which he characterised as virulent and unjust—which had been levelled by certain journals against the management of an undertaking that was perhaps the most prosperous in the world. The attacks he said were prompted by envy and jealousy, or by a desire to obtain a seat on the board. Threats of a competitive canal were put forward, but the board did not fear them and would not deviate from the course it had hitherto followed. He denied that the London agreement was a contract—it was, he said, simply a program; otherwise the shareholders would never have accepted a resolution that the dividend should in

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no case exceed 125 f. He assured the shareholders that no reduction in the dues would ever be made unless the dividend was increased proportionately. The board had remained faithful to the spirit of M. Ferdinand de Lesseps, and would continue to do so. The articles of the act of concession of the canal established the principle that all the customers of the canal should receive equal treatment, and none should be permitted to obtain a situation of favor by modification in the construction of ships. The chairman compared the present state of the canal with what it was formerly, and described the improvement realized to facilitate navigation by an increase in the width and depth of the canal. Other improvements were in progress and would not be the last. Following the chairman's remarks all the resolutions on the subject were carried unanimously.

In this connection the Suez canal traffic returns for last month will be read with interest. The figures relate to shipping passing through the canal in the month of May and in the first five months of the last three years:

MONTH OF MAY.

	1905.	1904.	1903.
Ships	343	328	334
Receipts	9,310,000 f.	9,200,000 f.	8,760,000 f.

FIRST FIVE MONTHS.

	1905.	1904.	1903.
Ships	1919	1750	1597
Receipts	51,057,190 f.	47,698,200 f.	42,854,631 f.

In a previous letter I have referred to the formation of an international combine of shipowners engaged in the Baltic trade, and definite steps in this direction have just been taken. At Copenhagen on Thursday last, the formation of an international association under the title of the Baltic and White Sea Conference was decided upon for the protection of the interests of shipowners, the improvement of freight conditions and the fixing from time to time of minimum freight rates. The conference will meet annually in different countries by rotation, while secretarial officials of the association will be permanently established at Copenhagen. Director Carl Ehaurman of the Danish Steamship Owners' Association was elected by acclamation president of the International association. A draft of the articles of the new association will be submitted to the next conference which will be held next autumn probably at Copenhagen. The conference further decided that the freights to be fixed should hold good from June 15 inst. until the next conference. It is however permissible to conclude freights for the next season, provided that they are not under the rates fixed by the conference. This combination will be welcomed by many British steamship owners engaged in the Baltic trade, who have suffered very severely during a long period of depression and unremunerative freights.

With regard to the difficulty under which Atlantic passenger liners were compelled to work owing to the British regulations regarding life-saving apparatus and surveys being different to those in force in the United States, which necessitated the liners going to the expense of complying with both and having to undergo survey periodically here and at New York, arrangements have now been made between the United States and Great Britain to accept without further survey as regards hull, machinery and equipment the certificates issued under the regulations of either country.

Reports have reached Liverpool that a new steamship service is being instituted between the Mediterranean and New York to cater for the passenger traffic, the ports to be called at being chiefly Genoa and Marseilles. This of course, will be in competition with the Anchor Line and Prince Line from Marseilles, etc., and the White Star Line from Genoa, and may to some extent affect the Cunard Line from the Adriatic ports.

Mr. Whitelaw Reid, the new United States ambassador, arrived at Plymouth on Saturday last in the Philadelphia. Deputations from the Corporation of Plymouth and the Southampton Chamber of Commerce were received by Mr. Reid, and in reply to their addresses of welcome he expressed his great pleasure at being so cordially received. He was he said, "glad to be able to reciprocate by saying that from our point of view, in the lapse of nearly four generations since our independent existence, and nearly three generations of unbroken peace between us, there has not been a period of ten years, or of five years, hardly even one, during which the relations between Great Britain and the United States have been so cordial and so full of mutual trust as they are today—hardly one in which lingering questions of possible friction have been so comparatively trivial, or in which such great general interests as concerned them both moved so nearly on parallel lines. Shall it not be our common effort to preserve and strengthen the foundations of this good understanding between our respective countries?"

HOW ENGLAND GOT THE SUEZ CANAL SHARES

Editor Marine Review:—At a recent dinner in his honor in London, Mr. Frederick Greenwood, the veteran journalist, and founder and first editor of the Pall Mall Gazette and the St. James's Gazette, told the story of how England acquired the Suez canal shares, which give her control of that highway to the east. The story runs as follows, and has never before been so fully told: The shares which cost $22,500,000 are now worth $145,000,000, and yield the British treasury a cash profit of $1,000,000 a year, besides the incalculable strategical advantage. The transaction has also benefited a multitude of people, the peasantry of Egypt, who, as a consequence of England's purchase of these shares, enjoy more freedom, more liberty, and more personal comfort than they have ever enjoyed for 1,000 or probably for 5,000 years.

The purchase was made at a time of grave danger to the British Empire and the peace of the world. It was hard to accomplish as, at first, Lord Derby, the minister of foreign affairs, and Sir Stafford Northcote, the chancellor of the exchequer, did not like it. But Lord Derby was won over to the idea. Some feared the French would rebel; in fact, the late M. Blowitz, then Paris correspondent of the London Times, had a story to the effect that when the news of the purchase was given to the French foreign minister, that great French gentleman broke a billiard cue across his knee and promptly left the room, muttering threats of the most alarming nature, but nothing came of that. Lord Derby said that England did not want $20,000,000 worth of Suez canal shares on its hands, that would not pay a dividend for 17 years. Lord Rowton was sent down a day or two after to Baron Rothschild who was rather staggered at the idea of finding $20.000,000 in a few days without any security. But he did supply the money, and right on time too. The whole transaction occupied eight or ten days, not a whisper got out, nobody heard a word of it, and there came a Friday when England was filled with hats thrown joyously into the air. All through England there was an acclaiming of this great achievement, which would redound for ever to the honor of Mr. Disreali (Lord Beaconsfield). The Times and other papers giving the news were received with a roar of approbation.

The control of this great world waterway has been a tower of strength to Great Britain ever since, and always will be, even when the assured American Panama canal is open.

Schenectady, N. Y. WALTER J. BALLARD.

Orders have just been issued by the chief of the United States revenue cutter service detaching Capt. J. C. Moore from duty as superintendent of construction and repair and assigning him to duty on the revenue cutter Onondaga. Capt. D. P. Foley is by a simultaneous order, detached from the revenue cutter Seminole and ordered to duty as superintendent of construction and repair at Baltimore, relieving Capt. Moore.

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DEPTH OF WATER AT VARIOUS PORTS

Mr. E. Corthell, civil engineer, has compiled the following table of depth of water at entrance and at wharves and quays of all important ports in the world. The figures are given at mean high water

Port and Country.	Channel depth existing ft.	Quay depth max. ft
Aberdeen, Scotland	24	—
Alexandria, Egypt	30	26
Algiers, Algeria	72	22
Amsterdam (canal), Holland	30	30
Antwerp, Belgium	52	52
Auckland, New Zealand	43	36
Baltimore, United States	31.5	31.6
Bangor, United States	31	34
Barcelona, Spain	24	20
Barry Docks, England	29	29
Bath, United States	30	30
Belfast, Ireland	25.5	34.5
Bergen, Norway	27	27
Bilboa, Spain	23	27
Bizerta, Tunis	30	26
Boston, United States	36.6	36.6
Boulogne, France	28	—
Bremen, Germany	—	—
Bremerhaven, Germany	34	34
Brest, France	39	37
Brindisi, Italy	26	27
Bristol, England	36	37
Brunswick, United States	25.3	25.3
Buenos Ayres, Argentina	23.7	—
Calcutta, India	27.5	27
Cardiff, Wales	35	35
Cette, France	23	23
Charleston, United States	25	35
Cherbourg, France	Deep Anchorage	—
Christiania, Norway	28	20
Civita Vecchia, Italy	28	18
Colon, Colombia	42	27
Columbia river, United States	36	—
Constantinople, Turkey	150	36
Constanza, Roumania	28	—
Copenhagen, Denmark	26	26
Corinth Canal, Greece	26	—
Danzig, Germany	22	13
Dieppe, France	28	28
Dublin, Ireland	26	35
Dundee, Scotland	31	31
Dunkirk, France	29	32
Fiume, Hungary	Deep Entrance	28
Galveston, United States	27.8	27.8
Genoa, Italy	52	30
Glasgow, Scotland	30	38
Greenock, Scotland	35	—
Halifax, Nova Scotia	83	45
Hamburg, Germany	24.6	34.6
Havre, France	30	—
Heyst (canal), Belgium	26.2	26.2
Hongkong, China	—	—
Hull, England	28	28
Kaiser William (canal), Germany	29.5	—
Konigsberg (canal)	15	—
Leghorn, Italy	26	19
Leith, Scotland	25.5	27.5
Libau, Russia	22	18
Lisbon, Portugal	39	37.2
Liverpool, England	50	56
London, England	44	43
Lubeck, Germany	22.5	16
Malaga, Spain	30	23
Malmo, Sweden	22	21
Manchester (canal), England	26	26
Maracaibo, Venezuela	15.5	36.5
Marseilles, France	55	39
Melbourne, Australia	—	—
Messina, Italy	Deep Anch.	Deep Anch.
Middlesborough, England	33	—
Mobile, United States	25.6	23.6
Montevideo, Uruguay	—	—
Montreal, Canada	28	29
Naples, Italy	33	26
Newcastle, Australia	26	28
Newcastle-on-Tyne, England	30.5	44.5
New Haven, United States	23	22
New Orleans, United States	26	30
Newport, United States	18.7	16.7
Newport News, United States	28.7	32.7
New York, United States	34.6	—
Norfolk, United States	30.7	30.7
Odessa, Russia	30	26
Ostend, Belgium	31	33
Palermo, Italy	28	22
Pensacola, United States	32.6	29.4
Philadelphia, United States	28	32
Portland, Ore., United States	24	24
Portland, Me., United States	39.3	38.3
Port Lyttelton, New Zealand	26	26
Port Natal, South Africa	26	26
Port Royal, United States	25.3	28.3
Port Said, Africa	30	30
Portsmouth, England	30	30
Portsmouth, United States	49	49
Providence, United States	29.4	31.4
Quebec, Canada	92	42
Rangoon, India	90	30
Riga, Russia	22	20
Rio de Janeiro, Brazil	34	—
Rostock, Germany	17	16
Rotterdam, Holland	27.8	33.8
Sabine Pass, United States	26.5	26.5
St. Johns, New Brunswick	36	48
St. Johns, Newfoundland	33.8	33.8
St. Petersburg, Russia	20.5	20.5
San Diego, United States	35.5	51.9
San Francisco, United States	39.2	39.2
Soo Canal, United States	21	—
Soo Canal, Canada	21	—
Savona, Italy	26	25
Savannah, United States	24	24
Shanghai, China	24	—
Southhampton, England	41	43
Stettin (canal), Germany	23	26
Stockholm, Sweden	30	26
Suez Canal, Egypt	28	—
Sulina, Roumania	24	24
Sunderland, England	26.5	44.5
Sydney, Australia	34.5	35
Tampico, Mexico	27.4	25
Toulon, France	36	—
Trieste, Austria	30	30
Tunis, Tunis	30	21
Valparaiso, Chile	—	—
Venice, Italy	26	26
Vera Cruz, Mexico	31.5	31.5
Victoria, Canada	38	38
Vladivostock, Siberia	54 to 90	27
Washington, United States	22.5	25
Wilmington, N. C., United States	22.5	22.5
Yokohama, Japan	30	30
Average channel depth at mean high water at 123 ports.		31.63
Average quay depth at mean high water at 106 ports....		29.92
Depth at Constantinople taken		150.00
Depth at Dieppe		28.00
Average 31.63 with Constantinople		150.00
Average 30.66 without Constantinople.		

Rear Admiral Charles Rae, chief of the bureau of steam engineering, has addressed a letter to the bureau of navigation requesting the assignment to duty under the bureau of steam engineering, for the purpose of special instruction in engineering, of the following midshipmen who have recently completed the two years' cruise at sea and have been examined for ensign: Midshipmen W. R. Raudenbusch, C. C. Moses, A. S. Kibbee, A. T. Brisbane and F. H. Sadler. When they report for duty two of this number will be assigned to the navy yard at New York, two to the navy yard at Norfolk, and one to the yard of the Newport News Ship Building Co. at Newport News, Va. The following midshipmen have been recommended for orders for duty under the Bureau of Ordnance for special instruction in ordnance, having been examined for ensign upon the completion of the two years' cruise at sea: Midshipmen Stephen Clegg Rowan, Ralston Smith Holmes, Walter Stratton Anderson and John S. Arwine, Jr.

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DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED OR ASSOCIATED WITH MARINE MATTERS ON THE FACE OF THE EARTH.

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JUNE 22, 1905.

All the dangers in navigation do not consist of reefs and shoals and narrow channels. While these dangers cannot be over-estimated, the greatest of all has been strikingly called to the attention of those interested in navigation within the past two weeks by the large number of strandings, collisions and other minor accidents, due to the presence of unusually heavy fogs at this time of the year. The loss of the Hawgood steamer Etruria in collision with the steamer Amasa Stone, off Presque Isle Bay, Lake Huron, on Sunday can be traced directly to the heavy fog. Many steamboat owners have given masters of steamers instructions not to attempt navigation under conditions made extra hazardous by these fogs. In most instances, however, the navigation of lake steamers is left to the good judgment of the master, who, in order to make records, puts aside ordinary precautions and attempts, in order to deliver his cargo on record time, to drive through all sorts and conditions of weather. The Marine Review, two weeks ago, called attention to the disregard of many masters to the common rules of the road and their failure to blow or answer passing signals. The United States steamboat regulations provide signals for thick weather, and it is all important to the interests of all concerned that these be observed in the strictest possible manner, in order to make navigation reasonably safe and guard against reckless manipulation of the vast floating properties. A steamboat master in a recent interview said that during his experience he had often, during a heavy fog, heard the roar of an oncoming freighter with a bone in the teeth long before a signal was blown. A bit of sharp practice indulged in by some of the reckless masters is to allow the other fellow to do the signaling and himself take chances on sliding through in safety. The fog which envelops everything on these occasions makes it practically impossible to identify a steamer, unless that steamer is damaged in collision and must make report to the proper custom officers upon her arrival. For many years it has been said frequently that navigation on the lakes is simply a matter of observation. The government has lighted every shoal, established ranges, placed buoys and spars along every navigable channel and assisted the vessel master in every possible manner. These aids to navigation have undoubtedly lessened the number of strandings, but the matter of collision rests upon the navigators themselves, and although it may be true "that there is a light on every corner and a rag on every post," it does not lessen the obligation of the master to heed the regulations and avert collisions and loss of property even at the loss of a few hours' time—to himself or his owner.

It is just a year since the country was horrified by the appalling disaster on board the excursion steamer General Slocum in New York harbor whereby nearly 1,000 persons lost their lives. As a rule accidents are speedily forgotten but this one illumined in such a ghastly manner a condition which menaced a considerable portion of the pleasure-seeking public that the attention of the whole country was riveted upon it. There were laws enough on the statute books to prevent the occurrence of such a catastrophe, but unfortunately they were not enforced. The inquiry into the disaster was followed by a very rigorous revision of the steamboat inspection laws and, as is usual under such conditions, the regulations were made more severe than was needful. There are a great many conditions embodied in the new rules which are not practical: there are also other conditions which subject vessel owners to unnecessary expenses. However, the new regulations are to go into effect on July 1. Meanwhile the steamboat interests of the country have been making a faithful effort to comply at any rate with the spirit of the new regulations. New equipment has been purchased by wholesale, notwithstanding the fact that much of the old equipment was quite as good as the new. In an endeavor to

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make the regulations meet the varying conditions which obtain in this country with its diversified navigation, rules have found their way upon the books which cannot fail to work a hardship to certain localities. For instance, it is absurd to apply the same rules for the safe-guarding of life to the freight carrier of the great lakes as is applied to passenger boats on salt water. The necessity for such extreme precaution does not exist on the freight carrier. The executive committee of the supervising inspectors of steamboats will meet in Washington on July 1, at which time the steamboat interests of the country will appear before it to request a modification of the rules or else to permit an interpretation to be placed upon them which will eliminate unnecessary hardships.

THE GARY HOLDS THE CARGO RECORD

The new steamer E. H. Gary, of the Pittsburg Steamship Co. during the past week established a new lake record by carrying 10,629 gross tons of ore from Ashland to South Chicago and thereby breaking all cargo records from Lake Superior. The Wolvin's record from Duluth to Erie was 10,245 gross tons. The Gary's record on the first trip from Escanaba to South Chicago was 12,003 gross tons as compared with the former record made by the Augustus B. Wolvin which carried 11,083 gross tons from Escanaba to South Chicago. The Gary is one of four of the monster ships to come out this season for the Pittsburg Steamship Co. and measures 569 ft. over all, and 56 ft. beam.

THE PITTSBURG STEAMSHIP CO.'S STEAMER E. H. GARY WHICH HOLDS THE CARGO RECORD ON THE GREAT LAKES.

FREIGHT SITUATION

So many conditions serve to influence lake trade that it is hardly possible to see more than a week ahead. During the past ten days fog has seriously interrupted the movement of vessels and has been the cause of serious losses through collisions. Quite a number of ore carriers lost several days by reason of fog and at both the upper and lower lake ports there was for the time being a dearth of tonnage. Some of the Lake Erie ports were entirely cleaned up during the latter part of last week. The movement of ore continues very heavy and coal cargoes are also plentiful, so that all classes of vessels are having quite enough to do. Very few ships are applying for grain at Chicago with the result that the rate of grain has advanced to 1⅜ cents.

HEAVY MOVEMENT OF IRON ORE

Duluth, June 20.—There is no hitch in the rapid movement of iron ore toward the lake ports and down to Lake Erie. If managers of mines fear any trouble later they are not saying anything about it, and are letting the sorrows of tomorrow be taken care of by tomorrow, at least so far as the public is aware. The business of the various railways to the head of the lake is tremendous, and it is not improbable that not less than 2,800,000 tons will be brought from Minnesota mines to Duluth, Two Harbors and Superior this month. The proportion of iron ore from the Mesabi range is greater this year than ever before, and of Mesabi ore the amount sent down by open pit mines is considerably in excess of any previous year. This is not because other ranges are becoming exhausted, for there is more ore in sight on old districts than ever before, but for the reason that the Mesabi is cheaper mining and has large minimum agreements and for the further fact that steel makers are learning how to use a larger and larger proportion of Mesabi in their furnace mixtures. As to the proportion of open pit ores, that is due in part to the fact that many new open pits have been established, and because the big minimums are usually on big mines that can easily produce a large tonnage.

C. Durm & Son of Winan's Cove, Md. are building a fast gasoline boat for White & Middleton. The launch is 45 ft. long, 7 ft. beam and draws 8 in. of water. She will be equipped with a White & Middleton engine of 16 H. P.

The Pusey & Jones Co., Wilmington, Del., launched a combination boat June 13 for the United States navy department for service in Guantanamo Harbor, Cuba. She is 80 ft. over all, 30 ft. beam and 8 ft. 9 in. deep.

The Board of Supervising Inspectors of Steam Vessels will meet in Washington on July 1 to consider a number of protests that have been made against the new regulations.

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ENLARGEMENT OF THE PORT OF ANTWERP

The sudden decision of the Belgian government to adopt the new plans for enlarging the port of Antwerp has come as an agreeable surprise to the shipping world. For the past 20 years the necessity of enlargement has been recognized by every interested party, but during that time it has been impossible to agree upon a plan of extension to satisfy everybody interested. Some ten years ago two parties were formed, one advocating the enlargement by centralization, that is to say, by constructing docks and basins on the left bank of the river Scheldt at the Tete de Flandre, opposite the center of the city of Antwerp, the other clamoring for an extension at the north of the city, the cutting of an entirely new bed for the river Scheldt, and the conversion of the old bed into a vast basin.

To the plan for extending in the direction of the Tete de Flandre interprovincial obstacles were raised. The Tete de Flandre is in Flanders, and it would be of little use to that province were the province and city of Antwerp to purchase the land necessary for the extension. On the other hand, Antwerp did not see the advantage of spending money on the territory of another province which would reap all the benefits. That the extension is an urgent necessity is more strongly demonstrated than ever, and during the past few years much valuable time has been lost in discussing multitudes of projects. In the meantime tonnage has been increasing until Antwerp has become the third port of the world, and it is with difficulty that berth room or anchorage is found for the incoming traffic.

For the past two years little has been heard of the extension projects and the government has been accused of procrastination, until, on Friday, April 14, the news was announced by the minister of finance, Count de Smet de Naeyer, that after a careful and laborious study of two years the government had elaborated a scheme that would give satisfaction. Its execution will cost something like 250,000,000 francs ($49,250,000) and, it is estimated, will take ten years.

The plan now adopted is far more elaborate than that first chosen by the government, although it comprises all the original propositions which, some years ago, received the approbation of eminent engineers of both hemispheres, notably those who had charge of dredging in the Mississippi river. In fact, I have been informed that in carrying out the cutting of the new river bed the government will probably use the same type of dredging machine employed by the American engineer, Bates, in dredging the Mississippi, which has been generally recommended by most of the engineers on account of the rapidity of its work.

Eleven years ago an eminent engineer who took a prominent part in the Antwerp international exhibition of 1894 stated that the plan for cutting the new bed was minutely examined by the jury of which he was a member, and which was composed of competent engineers from all parts of the world. Opinion, he said, was unanimously in favor of this scheme, and it was furthermore agreed that the rectification of the course of the Scheldt was an absolute necessity, owing to the constant danger of the present river bed becoming blocked by the movable sand banks. This opinion has now become more general, although at first it was earnestly opposed by the municipal authorities of Antwerp. It is now claimed, however, that by diverting the course of the river and giving it a deeper bed all chances of shifting sand banks will be avoided, and that the present dangers to navigation caused by the sharp bends in the river will be entirely overcome.

The immediate necessity for prompt action was very keenly felt as far back as 1897, when the city of Frankfort-on-the Main commenced a campaign against Antwerp and in favor of Rotterdam. The Frankfort chamber of commerce urged certain members of the Reichstag to advocate the withdrawal of the proposed stipulation in the German postal contracts with the North German Lloyd Co. that the steamers of that company must call at Antwerp and Rotterdam, holding that the call at Rotterdam was sufficient. There was no doubt at the time that the Rhenish provinces were and that they still are afraid of the competition of the port of Antwerp, and inasmuch as Holland is not an industrial country and does not compete with them, they were looking for an opportunity to favor Rotterdam at the expense of Antwerp. The reason for this is clear. Belgium is encroaching upon German trade; she is supplying the markets of the far east to a great extent, and the management of the North German Lloyd sees that it is to its advantage for its steamers to call at Antwerp and carry away the thousands of tons of dead weight cargo that await them.

The Frankfurter Zeitung at that time published erroneous statements detrimental to the port of Antwerp. The Antwerp chamber of commerce took the matter up and called the attention of the Belgian government to the unjustifiable attack. A full report, proving the misrepresentations of the Frankfort chamber of commerce, was published in Germany and sent broadcast throughout that empire, putting to confusion the detractors and serving as a huge advertisement for the port of Antwerp. The Rhenish deputies, however, still held to their purpose and tried to strike a blow at Antwerp, but the special committee appointed by the Reichstag to examine the question of postal subsidies voted by 10 to 2 in favor of calling at Antwerp. The Reichstag upheld the vote of its committee. So far, then, Antwerp has held its own. But the government understands fully that on the least excuse for complaint her rivals will jump at the opportunity to proclaim the superiority of Rotterdam, and that it behooves it to see that the port of Antwerp's maritime facilities are and remain such as to defy all European competition.

While the great plan of extension has been under examination, the government has added 6,500 ft. of new quays on the south river front and has begun work on new docks to the north of the American and Lefebre docks, with direct communication by a new sluice into the river at the Austruweel bend, leading from the Lefebre dock, and allowing the admission of vessels drawing 28 feet of water. On the completion of these docks, known as the intercalary docks, vessels will no longer have the annoying, roundabout journey through the Kattendyk, but will be able to enter the northern docks directly from the river, an improvement which will relieve the traffic to a very great extent.

Now comes the new and vast extension project, which incorporates the new docks above referred to, and which will at least triple the area of the port of Antwerp and make it larger than any port in existence, giving it 60 kilometers (37.3 miles) of running quays.

The government project provides first for the cutting of a canal, forming a quarter of a circle, entering the river at the Kruischanz, a point just above the town of Lillo, and joining the dock system at Antwerp by entering the northwest wing of the new intercalary docks in course of construction to the north of the present Lefebre dock. Extending inland from the right bank of the canal will be nine open basins. This canal will be of gigantic proportions, more than 5 miles long and 815 ft. wide. The canal will enter the river at the Kruischanz by three sluices, 975 ft. long, 98 ft. wide, and 39 ft. deep. The open basins along the right side of the canal will be 3,900 ft. long by 650 ft. wide. Near the canal sluice gates there will be a circular open basin 1,625 ft. in diameter. Dry docks 812 ft. long will also be constructed on the same side of the canal.

When the canal is completed the work on the new bed of the river will be commenced. The new bed will begin at a point above the Kruischanz, and the new canal will re-enter the present bed of the Scheldt just above the Austruweel bend, between the new grain warehouse and the Rhine quay. During the damming of the old bed of the river the new canal will insure navigation, so that at no time will there be an in-

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terruption of traffic. Engineers say that with the modern rapid dredging and excavating machinery the work may well be completed in ten years. The great island formed by the new and the old bed of the Scheldt will absorb the villages of Austruweel, Oorderen, and Willmarsdonck, which will cease to exist, and the land will be available for all kinds of industry, and might well be used for the establishment of the free port so frequently clamored for by the Antwerp trade.

As to the execution of the project, the government has consulted the most eminent engineers of the world, who have anounced it to be quite practicable. The great obstacle admitted when the new cutting was first mooted, the danger of interrupting navigation during the work, is now entirely overcome by the addition to the original project of the vast canal and system of open basins. As to the financial questions, the minister of finance has given the city the assurance that the government will advance all the funds required and that when matters are definitely settled the city will be given all the time it requires to take up its share of the burden on the easiset terms. The government's proposition is magnanimous, and leaves no obstacle in the way of the execution of the plan.

SUBMARINE SIGNALING

The success that has attended the introduction of submarine signaling by means of bells underneath lightships, or along shore, to ships far out at sea, is one of the principal topics now engaging the attention of naval experts the world over, for it is believed that the perfection of this system of communication may be the answer to that most perplexing naval problem of modern times, which is the discovery of a method by which battleships, cruisers, and other war craft may be able to detect the approach of submarine torpedo craft in ample time to locate their position and then to destroy or render them ineffective.

This system of submarine signaling, which has been tested with remarkable success on the great North German Lloyd liners Kaiser Wilhelm II., Kronprinz Wilhelm, and Kaiser Wilhelm der Grosse, as well as on many coastwise liners, the lightships at Sandy Hook, Fire Island, Cape Cod, and elsewhere, is based on the fact that sound travels under water at at least four times the speed that it does through the air. This fact has long been known and utilized by the savages on the African coast, who for centuries have been in the habit of signaling to one another by means of sounding instruments placed close to the edge of the water.

The system as now perfected may be described as a signaling apparatus, consisting of a submerged bell of peculiar design, which is attached to the bottom of a lightship or any other craft or structure, from which the signals are to be sent to a vessel at sea.

The apparatus through which the signals are received at the bottom of the ship and then transferred by means of wires to the officer on the bridge above, may be described as a pair of sensitive electric transmitters, placed on the inside of the ship against the outer planking below the water line, one transmitter being on the port and the other the starboard side of the vessel. In the pilot-house, or on the bridge, or wherever else above deck it may be desired, there is a telephone receiver, which is connected with the apparatus below the water line.

Alongside the receiving apparatus above deck is a switch by which the officer with the receivers at his ears is enabled to determine on the instant from which side the signals come. Then he shuts off the other side, and in less than a minute is able accurately to locate the bearing of the bell, its distance from the ship, and practically its exact position. The great accuracy of the results achieved by this system was never more admirably illustrated than on the voyage of the Kaiser Wilhelm der Grosse that terminated at New York two weeks ago.

On that voyage Capt. Kueppers said the liner picked up the bells at the mouth of the Weser as she was leaving German waters, and he declared that the signals were as clear as they could possibly be, and that a novice would have had no trouble whatever in distinguishing the numbers by which that point is known in the signal code.

Again, as the great liner neared the American mainland, the bells on Cape Cod, at Fire Island, and on Sandy Hook were just as plainly heard, and the vessel in each case was many miles at sea when the watch officer picked up their tinkle.

Now that the signal apparatus has been tested so successfully on the great merchant vessels, it was, of course, to be expected that their use in the detection and location of the elusive submarine torpedo would become a serious question in every navy, and it has. The United States government in the latter part of last year began experiments at Newport to determine the efficacy of the signals in this respect, but the experiments were cut short by the disabling of the submarine boat used in the tests, and later by rough weather, which rendered the yacht used as an observing station practically useless for the purpose wanted.

The tests, however, lasted long enough to show that the approach of submarine boats can be heard by means of this system and the position of the deadly craft located amply.

The British admiralty and the German naval department are also interested in the system, and, according to a well-known naval authority the day is not far distant when every battleship, armored cruiser, and other war craft which are designed for action above water will be equipped with the system.

One of the men to whom great credit is due for perfecting the system is A. J. Mundy of Boston, who, with Prof. Elisha Gray of Chicago, worked on the problem for four years. They discovered that sound could easily pass through the walls of a vessel, and Mr. Mundy then invented the device for placing the sound transmitter inside the hull of the ship, thus rendering her safe, so far as being deranged by submerged derelicts and other perils to navigation are concerned. Repeated tests proved that a bell with a lip or "sound bowl" several inches thick and having a high, clear, musical note, was by far the best adapted for the transmission of sound through water, and the result was the perfection of the system which has now been proved serviceable beyond all shadow of doubt.

To revert to the merchant marine, the signal bells have minimized by at least 50 percent the dangers to ocean-going craft incident to fogs and stormy weather along the coasts. For instance, if the Kronprinz Wilhelm is nearing Fire Island, near which point is Long Beach, whose shores are strewn with the wrecks of vessels that have been driven ashore in treacherous weather, and a thick fog prevails, the officer on the bridge, long before he nears the point, can tell exactly his position at sea and determine within a hundred yards the distance he is from the beach.

The same is true of Cape Cod, Sandy Hook, Vineyard Sound, Nantucket Shoals, and numerous other points along the American coast, the lightships of all these stations being equipped with the submarine bells. The Canadian government is also interested in the scheme, and already plans are being perfected for the safeguarding of the Atlantic coast, as well as the St. Lawrence from its mouth to Quebec.

No better idea of the great gap this invention has filled in ocean navigation can be had than by quoting from naval and merchant marine experts as to its usefulness. Capt. J. R. Selfridge, United States navy, declares that the invention "is the most valuable aid to navigation, without exaggeration, I may say, which the world has ever seen." C. A. Hutchins, superintendent of lights for Nova Scotia, adds that the system is capable of boundless application, while Lieut. Commander B. T. Walling, United States navy, in his report to the secretary of the navy, said that the bells could be distinguished for a distance of at least five and one-half miles by the most inexperienced persons.

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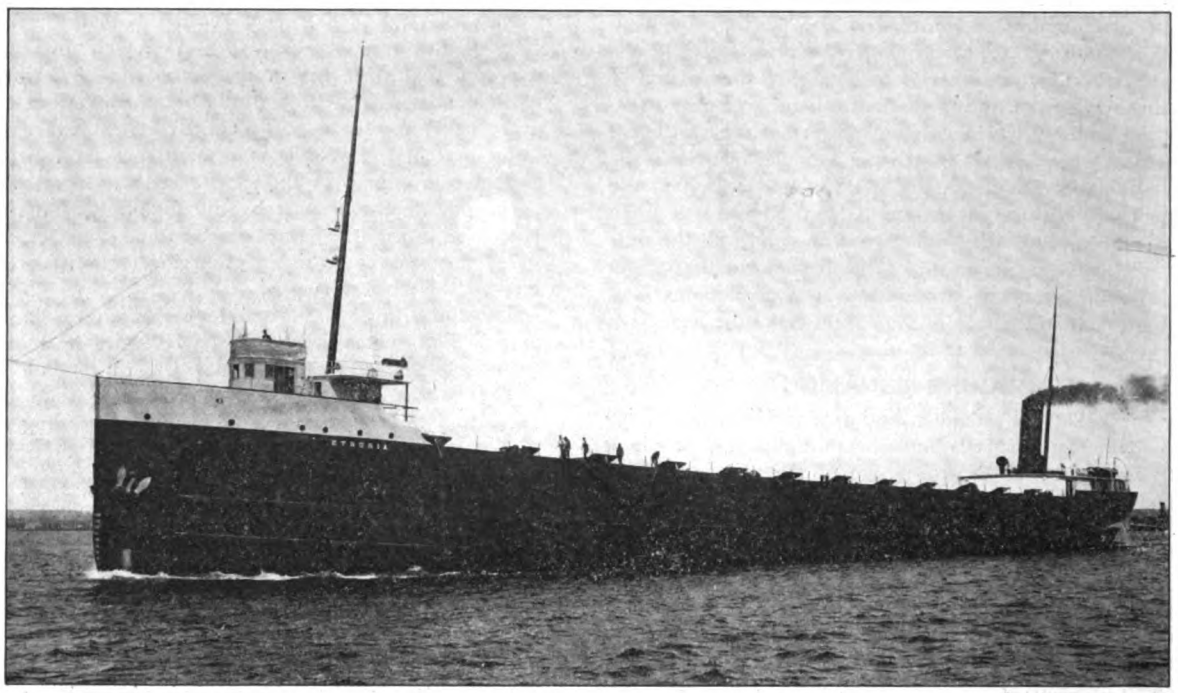
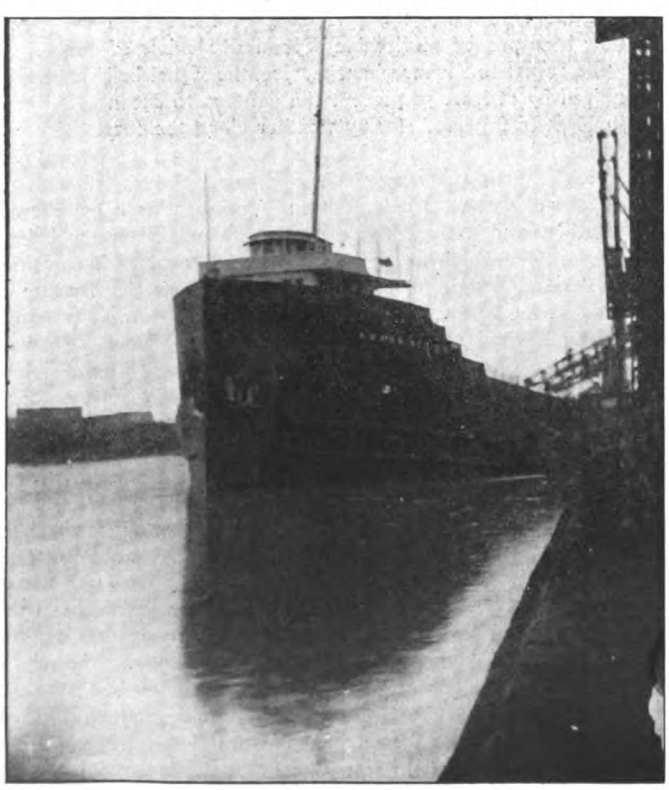
STEAMER ETRURIA SUNK

Early Sunday morning in a thick fog the steel steamer Etruria of the Hawgood fleet was sunk in collision with the steamer Amasa Stone ten miles off Presque Isle light Lake Huron, making not only one of the heaviest losses in the history of lake navigation but the only instance on record wherein a modern steel ore carrier has been sunk beyond recovery. The Etruria sank in about 400 ft. of water. At the time of the collision the Stone was bound down from Duluth to Lake Erie with a cargo of iron ore and the Etruria was bound up with a cargo of coal from Toledo to Lake Superior.



THE STEAMER ETRURIA WHICH WAS SUNK IN COLLISION WITH THE AMASA STONE.



THE AMASA STONE SHOWING INDENTATION IN STARBOARD BOW.

The Etruria was struck on the starboard side between Nos. 8 and 9 hatches. With the exception of three men forward and three or four aft the entire crew were asleep in their berths. No time was lost in getting on deck and the crew at once set about closing the gangways and dead lights. The steamer was listing badly, however, and it was seen that there was no hope of saving her and the life boats were accordingly launched. It is reported also that the Etruria sounded distress signals. Within twenty minutes after the collision the Etruria went down stern first with her bow high in the air, turning turtle as she disappeared No member of the crew was lost and none was injured with the exception of a wheelman who jammed a finger in launching one of the boats. The crew were picked up a few minutes later by the steamer Maritana of the Pittsburg Steamship Co.'s fleet and landed at Detour. The crew of the sunken steamer were later taken to Cleveland on the Anchor Line steamer Japan. They were met at Port Huron by Capt. A. H. Hawgood and Attorney Frank S. Masten of the law firm of Goulder, Holding & Masten. The depositions of the crew were taken on board. Capt. John Green of the Etruria in his statement says that at the time of the accident he was on watch and that the Etruria was running under check and blowing fog signals. Capt. Green said that after the Stone struck the Etruria the former sheered off and was lost in the fog.

The Stone took her cargo of ore to Cleveland and the testimony of her crew was secured by the firm of Hoyt, Dustin & Kelley. Capt. George B. Mallory of the Stone was on watch at the time. In the information submitted it is maintained that the Etruria attempted to cross the Stone's bows and that the roar of her coming through the water was heard before she blew passing signals. It is represented that the Stone was under bare steerageway at the time and was blowing fog signals when the Etruria blew a two-blast signal and crossed her bows at full speed. The Stone reversed her engines but it was not sufficient to prevent impact. The testimony shows the blow to have been a light one and not sufficient to rudely disturb a sleeper who was sleeping on the starboard side of the Stone near the point of impact. The injuries to the Stone are not serious and are wholly confined to her starboard bow. Immediately after the collision Capt. Mallory says that the Stone turned around and spent two hours searching for the

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steamer. All that she was able to find was a loose rail and therefore concluded that no serious damage had been done. The crew had of course, meanwhile been taken up by the steamer Maritana.

The case is one which will probably be fought in the courts as the testimony of both crews is so widely divergent. The Amasa Stone, operated by Pickands, Mather & Co., has been in commission only a month and is one of the largest boats on the lakes, being 545 ft. over all. The Etruria is also a modern boat, having been built at Bay City in 1902. The Etruria was insured for $260,000 in companies represented by Smith, Davis & Co. of Buffalo. Her cargo of coal was insured for about $13,000, which together with her freight list of $3,000 makes an insurance liability of $276,000.

ELECTRIC LOCOMOTIVES FOR ORE ROADS

Duluth, June 20.—"As the result of experiments now being made in electric traction, progressive railroad men must admit that the day of the steam locomotive for heavy freight service must close in time. It is bound to give place to the electric engine." So says General Manager W. A. McGonagle, of one of the United States Steel Corporation's iron ore railways, the Duluth, Missabe & Northern. The road is famed as having a greater density of traffic than any road in America, and it will this year move in the short term of eight months, over a line 100 miles long, more than 7,500,000 tons of freight.

Mr. McGonagle has just returned to Duluth from Pittsburg, where he has been to watch experiments in the Westinghouse-Baldwin electric locomotive, a new single-phase, double-ended, 176-ton engine being on trial there. It is no secret that the United States Steel Corporation considers the replacement of steam locomotives on its great northwestern ore lines that run out of Duluth, by electric traction, soon after the power of the St. Louis river has been developed by the Great Northern Power Co., near the head of Lake Superior.

During the experiments at Pittsburg this engine was able to handle with singular ease a train of 50 50-ton steel gondola cars, all of them new and stiff, and many with brakes set to increase the load. This train was 2,100 ft. long and the drawbar pull, as shown by a dynometer car, was very great and exceedingly steady and even. This train was started without jerk, and in five seconds from the time of turning on power the engine was exerting maximum power and pulling the train at full speed. The indicator card of acceleration of load showed a wonderfully true line and easy curves. This train was controlled by one man, who sat behind a little glass window and, by the motion of a lever or two responding to the touch of a finger, operated the entire train.

One argument against the introduction of electric locomotives has been that they cannot run on the same tracks as steam, the fumes from burning coal having a deleterious effect upon the wiring overhead of the complex trolley system. But at Pittsburg electric and steam trains are run continually upon the same track, and there is no deterioration of the overhead wires. The steam engine has been a self-contained machine, has carried all its parts within itself, and in that way has been far less subject to accidents than a machine dependent upon outside power, where generators, circuits, or anything else, might fail without warning, and at some critical time.

In this single-phase electric locomotive now under test there is but one set of gears between the power and the rails, and even this is to be taken away and the power attached directly to the axles. The intimacy of connection explains the absence of jerks and the quickness with which the full power can be applied upon the wheels. It is probable that the machine will be provided with automatic electric pumps, whereby in case anything happens to the outside power air shall be maintained in readiness for service at brakes, pumps to connect up and set to work on the instant the outside circuit is broken, and automatically. This is a matter of the gravest importance, especially for such roads as the iron ore lines of the northwest, where loads of 3,600 tons going down 2 percent grades might almost instantly become unmanageable were air to be off for the reason of any break in the circuit.

THE NEW STEAMER AMASA STONE IN THE LOCKS AT SAULT STE. MARIE.

It is very possible that, within two or three years the two railroads operated by the United States Steel Corporation in Northern Minnesota, and the Great Northern's ore line also, will all be either operated by electricity or being put into shape for such operation.

Mr. McGonagle fully believes that the time is close at hand when the long distance railroads of the United States, fortunate enough to be adjacent to sources from which electrical power can be derived and transmitted economically, will be operating by the new power, and that steam for railway service has seen its zenith.

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ELECTRICALLY OPERATED BULKHEAD DOORS

By George E. Walsh.

The recent installation of electrically-operated bulkhead doors on the two new 13,500-ton armored cruisers Colorado and Pennsylvania, illustrates in a practical manner the advances made in the past few years to safeguard a vessel. In the future the ships of the American navy will be equipped entirely with electrically-operated bulkhead doors, and the thirteen battleships and cruisers now in the course of building have had plans made for such equipment. The number of merchant ships that have been provided with some sort of system to operate their bulkhead doors by electricity has also steadily increased.

The pneumatic and hydraulic systems for operating the bulkhead doors had drawbacks which have caused a good many shipbuilders to abandon them in favor of the electrical. The bulkhead doors practically represent a part of a ship which is seldom needed, but when the emergency arises, instant and perefect operation is a matter of prime necessity. More shipwrecks have been caused by bulkhead doors being out of order in the moment of danger than by any other disarrangement of machinery. The impossibility of keeping the pneumatic or hydraulic systems up to their highest point of efficiency at all moments was a constant source of danger and uneasiness. The valves and packings were difficult to keep in perfect working order under all conditions.

Until comparatively recently the electrical control of the bulkhead doors was not considered perfect, but the development of various systems has gradually tended toward a standard of efficiency that makes the electric-control almost perfect.

There are several prime requisites in the operation and control of bulkhead doors. One is the control of the doors in all emergencies from several different places of a ship. The emergency station must be placed on deck near the pilot house, where the navigator can instantly close the doors at a moment's warning; but when once closed there must be some local manipulation of the doors from below. An officer below decks may need to pass through a bulkhead door that has been closed against him. Provision therefore must be made for local control, which temporarily overcomes the emergency control, but which immediately ceases to operate the moment the officer below deck has passed through. To secure perfect action in the moment of danger, the officer on deck must have definite signals which will show him when the doors are open and when closed. Moreover, he must be able to close the doors singly and in series, according to the needs of the moment.

The electrical system for operating the bulkhead doors on the new warships completely fulfills all of these requirements. The ship is wired so that there is an emergency station in or near the pilot house. In this station electric lights arranged in series indicate the exact position of the doors. A disc or dial is arranged for each door, and when the door is closed an electric circuit is completed, which instantly lights the small lamp on the disc. If any door refuses to respond to the operation of the navigator, the fact is made plain by the absence of the incandescent light on the dial numbered to correspond with the door.

When an officer passes through the closed door below decks, the fact is recorded by the disappearance of the light. If he closes the door after him the light immediately announces the fact in the emergency station. The power doors or hatch gears are operated by direct-current, reversible, bipolar motors, which are located in waterproof cases so that the service can be depended upon when the compartments below are flooded. These motors are built to carry considerable overloads, and in an emergency the whole series of doors can be closed simultaneously. With six motors in operation upward of twenty-five bulkhead doors can be closed in series within seventy-five seconds from the time the emergency controller is released.

The hatch-gears or power doors are provided with a switch which enables any officer below decks to open or close the doors from either side. This hand switch suspends the control of the emergency switch until released, when it automatically flies back and permits the door to close again.

The wiring for controlling the doors is simple and easily kept in repairs. A twin conductor is provided for the emergency station, and another connects each hatch-gear with the ship's mains. The wires are all inclosed in water-tight, fireproof insulating conduits, which make it impossible for water or change in temperature of the atmosphere to injure them.

American shipbuilders have accomplished more in adapting electricity to ship's needs than foreigners, and no satisfactory electrical-control of bulkhead doors has been worked out in European navies or merchant marine. Several systems have been adopted which combine the electrical with the pneumatic and hydraulic control, but electricity is employed as an auxiliary power rather than as the main dependence. A feature of the electrical control of great value is that no one can tamper with the bulkhead doors without the fact being immediately announced to the officer in charge of the ship. The little lamps would immediately betray any effort of the crew to close a door or to open one closed from the emergency station. Frequently members of a crew experiment with the bulkhead door mechanism for various reasons, and in an emergency the control is not perfect.

Another feature of the electrical control that recommends itself to captains and officers is the ease and simplicity of testing the mechanism in regular daily drills. The tendency now is to enforce daily or weekly operation of the bulkhead doors to see that they are at all times kept in perfect working condition. When such a drill requires a great amount of time and hard work, the officers grew negligent, and often the doors would not be closed for weeks and months at a time. There was little wonder then that they did not close or open easily when the emergency demanded it. Within seventy-five seconds from the time he touches the emergency switch, the officer in charge can close one after another of the twenty-five or more doors of the ship, each one requiring about three seconds. They are opened in a similarly quick and noiseless manner, and the drill of testing the mechanism thus occupies so little time and work that a rigid enforcement of this daily can hardly be considered a hardship.

An improvement of this American system of electrical bulkhead doors is to supply bells in the emergency station, which, in addition to the lighting of the red lamps, will announce the closing or opening of the doors. The ringing of such a bell warns the officer whose attention may be momentarily directed from the discs. A further improvement is to connect every part of the mechanism by telephone. It requires only a little extra wiring and mechanism to install an interior telephone system so that the captain in the emergency station can communicate directly with any officer sent below to the bulkhead doors. This method of precaution is considered of value in moments of danger when the rush of water might carry pieces of coal or other obstructions under the doors to prevent them from closing. An officer and crew sent below to remove the obstacles would need to be in constant communication with the captain on deck. With danger lights exposed in the emergency station, warning bells announcing the opening or closing of the doors, and telephone communication established with the deck officer or captain, it would seem as if every precaution possible had been taken to provide for an emergency in a collision or accident of any kind.

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HAMBURG-AMERICAN LINER AMERIKA

Steamship men have a surprise in store for them in the equipment of the Hamburg-American Line's giant steamer Amerika, which will begin her maiden Atlantic trip next October. There are innovations in accommodations and service such as electric "lifts" for passengers and a restaurant run on the a la carte system, a playroom for children, a gymnasium for adults, a dining-room on the promenade deck, trained nurses for seasick passengers, no upper berths in staterooms, running pipe water in every stateroom, a double-decked first cabin smoking-room, silverware that was used by the German Emperor, a special band for dinners, menus in twenty languages, twenty Italian marble chimney places and old-fashioned English stone hearths, decorations representing the art of every country and electric and Turkish baths. The Amerika is 687 ft. long, 74½ ft. in beam and 53 ft. in depth. Her displacement is 42,000 tons, dead weight capacity 22,000 tons and cargo capacity 16,000 tons. She can carry the contents of ten miles of cars.

The grand staircase will be in white paneling, broken up by mirrors, pictures and charming glass screens. Screens will be placed at various parts of the dining-room to prevent draughts. The dining-room will be 100 feet long and as wide as the ship. It will be finished in Louis XVI style, with no columns to interfere with service. Boucher's pictures and wood carvings of the Trianon at Versailles will decorate the walls of the dining-room. At the front of the dining-room will be a bas relief of George Washington, and the electroliers on each table are to be of mercury gilt. Bronze garlands of mercury gold are to hang down the balusters and on the clock of the dome over the dining-room. The writing room, which will adjoin the drawing-room, will be treated in boudoir type of the Empire style, in fine gilt, with heliotrope silk on the panels. In this room there will be reproductions of the old Empire writing desks and antique Empire plaques. The furniture in the two first cabin smoking rooms is to be of solid oak. One can imagine himself in a great hall or hunting room of an Elizabethan manor house. All the paneling will be handmade, and show the characteristic rough tool marks. One smoking room is above the other, the two connected by a broad staircase, which will have carving illustrative of hunting and incidents in the life of St. Hubert, the patron saint of huntsmen. Each "smoker" will have a brickwork chimney piece and stone hearth.

DEEP WATERWAYS COMMISSION

The deep waterways commission will meet in Ottawa at an early date. This is the joint commission of representatives of the United States and Canada which met in Washington last month, but could not pursue its inquiry on account of disagreement as to the scope of the work assigned to it. The United States officials contended that congress did not empower them to investigate beyond the waters of the great lakes and adjoining rivers.

At the approaching meeting of the commission in Ottawa these waters will be considered and at a later conference in the coming autumn the other questions, such as the St. John river dispute, will be attended to. Since the suspension of business by the commission at Washington it is stated that President Roosevelt and Secretary Taft have come to the conclusion that Canada should be granted her demand for an investigation of the international boundary waters on a large scope. The fact is realized here, however, that the executive authorities at Washington have not as large powers as has the government at Ottawa, and that they could not authorize a full inquiry before congress gave its sanction.

Canada is more interested in the investigation of matters outside the great lakes than those affecting these water ways. Therefore she would not consent to be a party to the limited inquiry, except on the understanding that the other matters in dispute would be taken up at a later date. In the case of the St. John, N. B., river trouble, a compromise has been reached between the contending parties, and which at one time threatened grave international difficulties, pending an investigation by this waterways commission in the coming autumn.

There is a well-understood feeling in political circles in Ottawa that should the United States authorities intimate to the Canadian government that it is desirable that the negotiations of the international joint-high commission, which so suddenly suspended its deliberations a few years ago on account of the Alaskan boundary question, should resume consideration of the remaining matters in dispute between the two countries such action would be welcomed by Canada.

JAPANESE SHIPPING SUBSIDIZED

In its edition of March 20, 1905, the China Mail, of Hong Kong, says:

"We hear on reliable authority that the Japanese government is subsidizing Japanese steamers plying on the China coast. If reports are true British steamers will have a hard struggle and will eventually disappear altogether unless the British government does something of the same kind. The following figures have been given us as being the amounts paid on runs indicated, in Mexican silver: Hong Kong to Shanghai, $141,700; Hong Kong to Tamsui, $108,700; Hong Kong to Anping, $40,700; Fuchau to Tamsui, $41,700; coasting around Formosa, $122,300; Taku to Kobe, $27,200; Taku to Yokahama, $115,300; Kilung to Kobe, $120,100; total, $718,200."

This amounts to about $331,000 gold, says Consul George Anderson of Amoy, China, in discussing the subject in a letter to the state department at Washington. That the policy has been successful is amply demonstrated in the increase of Japanese shiping at Amoy, the center of the Formosa-Chinese trade. In 1901, out of a total of 1,700 steamers in port, the British had 1,090, the Japanese 434, the Chinese 50, and the Germans 34. In 1902, out of a total of 1,742 steamers in and out of the port, the British had 1,047, the Japanese 429, the Chinese 134, and the Germans 64. In 1903, out of a total of 1,812 steamers, the British had 1,084, the Japanese 452, the Chinese 108, and the Germans 80, the British having about five-ninths and the Japanese about two ninths of the whole. Last year the war between Japan and Russia naturally scattered the Japanese fleet for the time being, but the Japanese chartered vessels to hold their business. Out of a total of 1,754 vessels in 1904 the British had 1,076, the Chinese 113, the Japanese 112, and the Germans 280. The transfer of the business from Japanese to German protection for the time being is indicated by these figures. It is evident, however, that German shipping in this part of the world is growing at a rapid rate, and the reasons for this growth are easily understood in connection with the German ship subsidy plan. That Japan is really in command of all the carrying trade it had before the war is perhaps too much to say, but it is at least certain that the break in the Japanese shipping business caused by the war will be only temporary. The indications are that the present year will show practically the old figures in spite of more or less demand for transport service in connection with the war.

The navy department last week decided to award contracts for guns and mounts for the battleship New Hampshire, and the armored cruisers North Carolina and Montana, bids for which were recently opened, as follows: Bethlehem Steel Co., four 12-in. guns at $51,644 each, and eight 8-in. mounts at $19,990 each. Midvale Steel Co., thirty-two 6-in. guns at $12,860 each; twelve 7-in. guns at $14,355 each; eight 8-in. guns at $17,142 each, and thirty-three 6-in. mounts at $7,588 each. The guns are to completed with spare parts and accessories, while the mounts are to be complete with sights.

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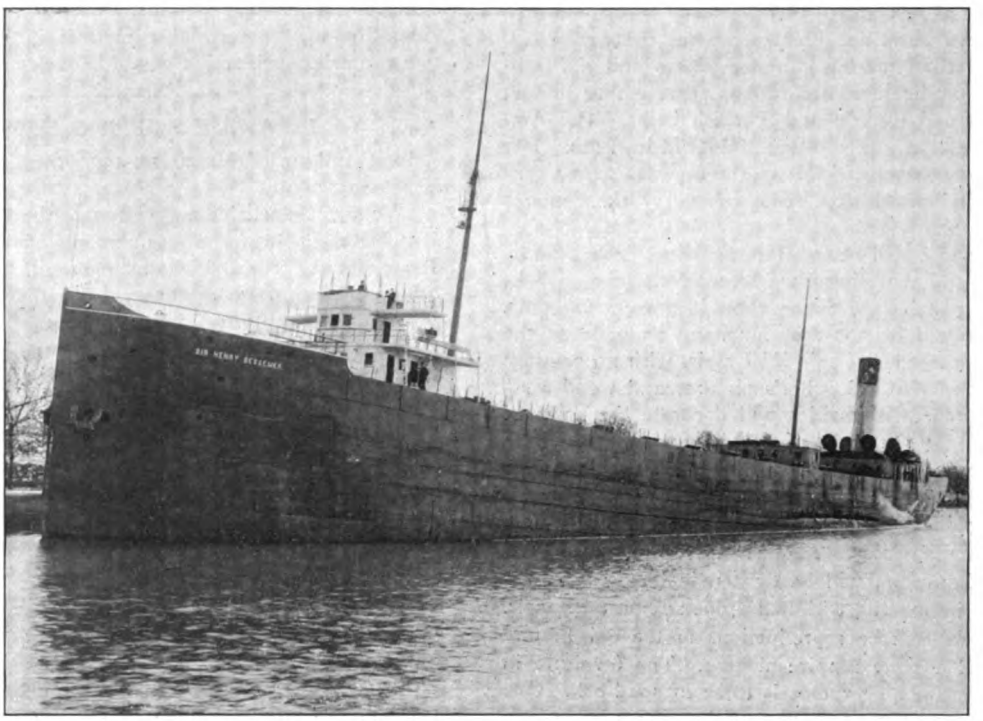
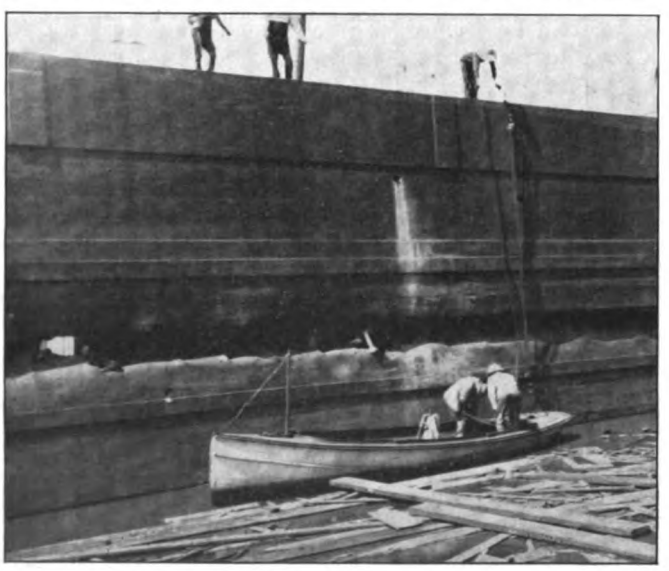
INJURIES TO THE BESSEMER

The fogs which have prevailed on the upper lakes during the last few days have raised havoc with navigation of ships. The steamer Bessemer of the Pittsburg Steamship Company's fleet which was struck by the Tomlinson steamer Sylvania off White Fish Point in a dense fog has been taken to Cleveland for repairs. Her injuries are very apparent and it was quite clear that the salvation of the Bessemer lay wholly in the fact that she was light at the time of the collision. Had she been loaded no power could have saved her. She has a hole on her port side 80 ft. long, the accompanying photograph showing the nature of the damage very clearly. She was hit twice by the Sylvania, once forward and again amidship. A survey has been held of the Besssemer at Cleveland and notwithstanding that all her injuries are above the water line she will be placed in dry dock. The Bessemer has about twenty-four damaged plates in addition to sixty broken frames and a large number of broken stringers. It will take from three to four weeks to make repairs upon her. The steamer Syivania will be repaired at the South Chicago yard of the American Ship Building Co. Her injuries too are somewhat serious and she will be in dry dock about three weeks.



THE BESSEMER AFTER HER COLLISION WITH THE SYLVANIA.



CLOSE VIEW OF THE BESSEMER'S INJURIES

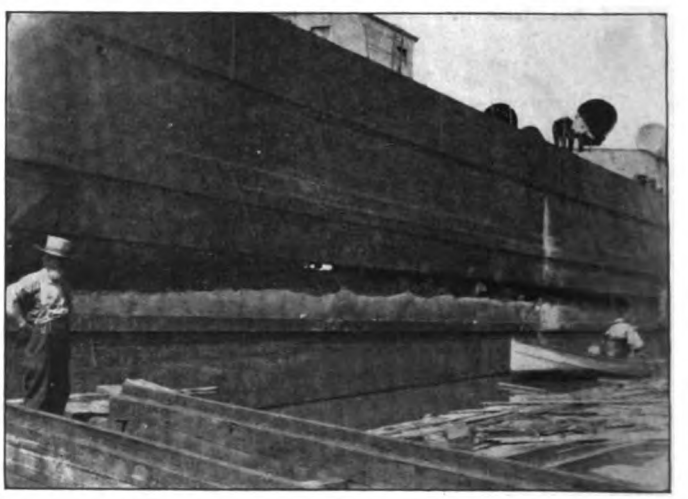
AROUND THE GREAT LAKES

The new steamer Lyman C. Smith left Detroit this week. She is under command of Ralph A. Lyons.

The Boone Dredging & Construction Co. has been awarded the contract for deepening the harbor of Collingwood, Ont.

The tug Kunkle Bros. will be stationed at Lorain and will take the place of the Industry which went to Toledo.

The steamer Stephen M. Clement of the Mitchell fleet left Lorain this week on her maiden trip. Capt. Charles B. Galton of Marine City is master of the vessel.



ANOTHER VIEW OF THE BESSEMER'S INJURIES.

The steamer Penobscot struck an unknown obstruction just before entering the Canadian locks this week. Her water bottom is full and her cargo will have to be lightered.

An examination of the steamer W. H. Gilbert in dry dock at Detroit shows that seven plates will have to be replaced as well as a number of frames.

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While steaming for South Chicago with a cargo of iron ore the steamer George Stone missed the harbor in thick weather and finished up on the sandy beach near Indian Harbor. She was later released.

Supervising Inspector Westcott has ordered local inspectors York and Gooding at Marquette to make a thorough examination of the circumstances of the burning of the steamer Harriet A. Hart at Detour.

The Duluth-Superior Dredging Co. has filed articles of incorporation. The incorporatives are all residents of Duluth and are Wm. Clifford, Napoleon Grignon and Renwick B. Knox.

Mr. Frank E. Kirby of Detroit is at work upon the plans for the new passenger steamer for the Detroit and Cleveland Co. The new steamer will be 442 ft. over all, and 84 ft. beam and will have a carrying capacity for 4,500 passengers.

The Wisconsin Bridge & Iron Co. of Milwaukee has been awarded the contract to build the new draw span over Portage lake which was wrecked on April 15 by the steamer Northern Wave. The contract price is $70,922.

The Davis Dry Dock Co., Kingston, Ont., has been awarded the contract to rebuild the hull of the government steamer Scout for $7,000. The old machinery is to be utilized and the steamer is to be ready to go into commission next September.

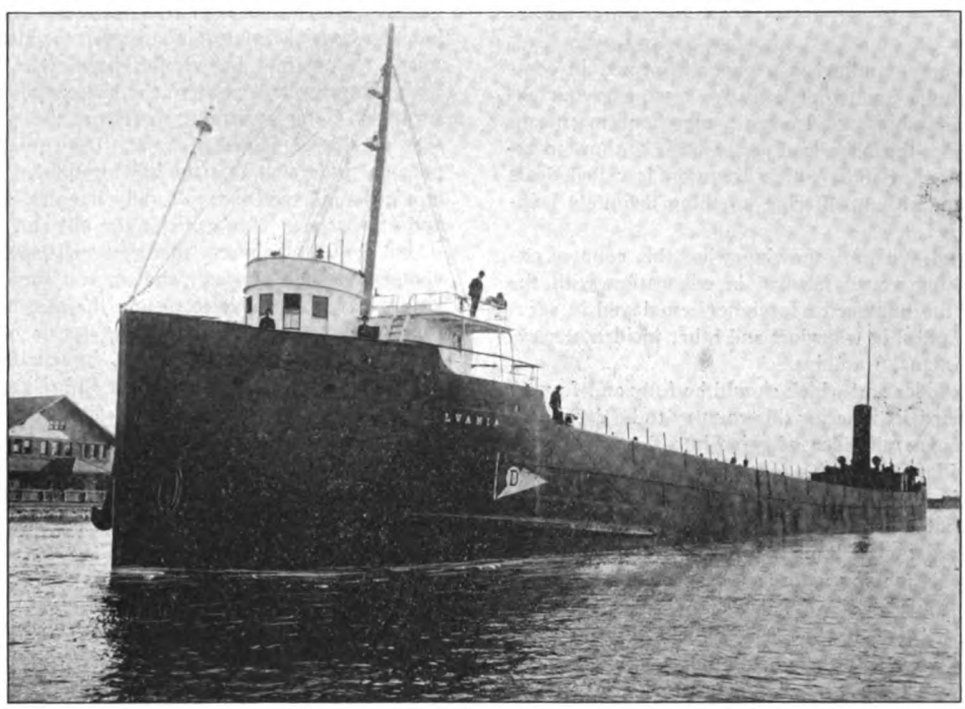
Major James G. Warren who has been in charge of government work for the past five years with headquarters at Milwaukee has been transferred to Cincinnati. He will be succeeded by Capt. Wm. F. Judson.

The passenger steamer Harriet A. Hart, bound from Mackinac to Detour, was burned to the water's edge last week a few miles from Detour. The steamer was valued at $37,000 and was owned by the Green Bay Transportation Co. of Green Bay, Wis. The Hart was formerly the Louisville of the Graham & Morton Line.

Bids were opened by Col. Davis, government engineer of Detroit, for work in St. Mary's river in Bayfield shoal and the entrance angle to the Middle Neebish. The lowest bid for removing 99,000 cubic yards at the shoal was $45,325 by H. W. Hubbell & Co. of Saginaw, Mich. Hickler Bros. of Sault Ste. Marie got the contract for work at the Middle Neebish at the bid of $110,635.

The Canadian Ship Building Co., Toronto, announces that it will operate its Niagara river ship yard for larger work such as freight and passenger steamers for the great lakes which are too large to go through the Welland Canal. At the plant of the Bertram Engine Works Co., the Canadian Ship Building Co. will construct smaller steamers for service on Lake Ontario and for the present the machinery for all of the Canadian Ship Building Co.'s work will be built at the engine company's works in Toronto. Mr. A. Angstrom is the general manager of the Canadian Ship Building Co.

Some costly accidents have occurred on the great lakes within the past month and marine underwriters will by no means have a profitable year. The year started badly with the losses caused by ice but was followed by a period of comparative immunity from accidents so that the underwriters kept up hope. The losses during the past month, however, while few, have been heavy. They began with the sinking of the steamer Thomas W. Palmer and have been followed by the loss of the Etruria, Harriet A. Hart, Yakima, City of Collingwood and the collision of the Sylvania with the Bessemer.



THE SYLVANIA TAKEN AFTER HER COLLISION WITH THE BESSEMER

The steamer Wm. E. Corey building for the Pittsburg Steamship Co. will be launched at the South Chicago yard of the American Ship Building Co. on Saturday next. A number of invitations have been sent out for the launch and the affair will be one of more than ordinary importance. The sister ship, George W. Perkins, will be launched at the West Superior yard of the American Ship Building Co. on Monday next. This will leave only the Frick of the quartet on the stocks. The steamer Wm. A. Rogers will be launched from the Lorain yard of the American Ship Building Co. on Tuesday next.

The work of putting a wheel on the steamer Dorothy was sucessfully completed under the direction of Capt. Thomas Donnelly of Kingston, Ont., last week and the Dorothy left for Port Dalhousie. Capt. Donnelly would have preferred putting on the wheeel with the divers and without the aid of a pontoon, but the underwriters and the owners of the boat insisted on the wheel being put on inside a caisson so that the work could be examined and completed to the satisfaction of the engineer. The Dorothy is the deepest vessel that has ever been pontooned in such a manner on inland waters and extra provision had to be taken to make everything safe and secure on account of the cargo. The vessel's stern was raised 5 ft. and the pontoon leaked so little that ten minutes' use of a syphon every two hours kept the water out of it.

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MR. GOULDER'S COMMUNICATION

Mr. Harvey D. Goulder, president of the Merchant Marine League of the United States, sent the following communication to the New York Journal of Commerce last week which the Journal published, however, without replying to as was hoped by Mr. Goulder. In his communication Mr. Goulder says:

Sir—With the diffidence becoming one of the imperfectly informed, but with perfect respect, I beg to call attention to your editorial of June 7 on the subject of subsidized merchant marine. It seems true that the subject has been lightly considered, especially by the newspapers, and that we are all too imperfectly informed.

Your acknowledged standing as a paper informed in commercial matters would seem to make it proper to ask your expression on the desirability of having a merchant marine in foreign service under the American flag, and, if so, how to accomplish it. The editorial to which attention is called deals in general criticism, without offering anything definitely helpful.

You have at hand statistics showing what this country expended in purchasing vessels abroad in connection with the Spanish war, and the number of foreigners employed in service of the United States, in transport and other incidental service, as well as on actual warships.

A question to consider and which should be fully and frankly discussed is whether it is wise for this country to be dependent upon the purely commercial idea of going into the world market to secure auxiliary ships, without which the navy would be impotent, and in securing men towards manning not such auxiliaries alone, but the warships themselves. This question has to be considered in the light of the present-day view of the Monroe Doctrine, making us in some sense conservator of the peace in this hemisphere, and also of the extension of our property interests by way of Hawaii and the Philippines, under which we have come into the world politics for fundamental purposes either of trade or assimilation.

The proposed bill of the Congressional Commission, if passed and put into operation intelligently and honestly, should tend to alleviate our reliance upon the mere power of this country to purchase ships abroad and hire men abroad for the purpose of our naval operation should a trial come. It would seem that the lesson of the last great naval battle is that it is well for a country in any large sense dependent on naval power to have, as we once had, a contingent of seamen. It would almost seem, too, that the necessity for this is greater since service on the modern warship has lost much of the romanticism and attractiveness of sea life. Either the bill of the commission should be passed or some other means devised for providing what may be termed a naval militia, if it is good for this country to have such a source of supply in time of need.

Popular as may be the idea of a great navy—and that it is popular appears from the general impression that we will reach soon the annual expenditure of one hundred and fifty millions for the navy—this does not seem so important as the question of extending our trade. Beyond dispute, we have slight advantage of trade with Central and South America relatively. It is a common belief that trade follows the flag. We have spent many tens of millions of dollars in acquirement of the Philippines and beneficent regulations of the people there, and we have expended and are expending many precious lives in that work. We are undertaking to build the Panama Canal at an expense of hundreds of millions, if climatic conditions permit. Your newspaper has been a supporter of the improvement of New York harbor, without serious question of the number of millions to be expended for the accommodation of shipping. You have statistics at hand as to our exports in farm products and manufactures. These undeniably show an increasing proportion of manufactured articles. Do you regard it, and, if so, for what reason, a safe policy to depend on the foreign competitor for shipment of our surplus of farm products and manufactures, or that the best interest of the farmer and manufacturer, the men engaged in internal transportation by water or by rail, the workman employed in all these enterprises, is conserved and safeguarded by depending upon foreign vehicles, and is this a fair and sufficient means of extending our trade? The question of shipbuilding and the operation of ships, with its employment of men, while an incident to the bigger question, is in itself very important.

It is the purpose of the League, which I assure you has no special interest to serve, to bring this matter as much as possible before the people, in the hope that the next Congress will observe the behests of presidents and platforms by doing something to restore the American flag to the seas on ships engaged in trade. I do not hesitate to give my personal judgment that the bill formulated by the Commission is a good bill, which would only have to bear the test of time and experience. You criticise the bill and the motives behind it, but I do not observe that you suggest better means of accomplishing the purpose, and so you leave in doubt whether you regard it desirable to restore the merchant marine. Meantime we have before us the object lesson of the United States Government employing the taxes contributed by all the people of this country to build ships in China and proposing to buy material for the Panama Canal abroad, and to buy ships or charter them abroad, so that the Government, exercising its sovereign authority, is on the one hand following up the trusts and on the other hand exercising privileges denied to its citizens.

I may be presuming in writing this, and you may not care to publish a communication of this length were you otherwise willing to entertain it, but your control of your own space affords you complete defense. Very truly yours,

HARVEY D. GOULDER,
President Merchant Marine League.

INDEPENDENT PNEUMATIC TOOL CO.

The Independent Pneumatic Tool Co. of Chicago recently acquired the Aurora Automatic Machinery Co. of Aurora, Ill., builders of the Thor piston air drills, pneumatic riveting, chipping, calking and beading hammers, piston air motor hoist, pneumatic saws and other air appliances. The general offices of the Independent company are located at the First National bank building, Chicago, Ill., and the eastern offices at 170 Broadway, New York city. The officers of same are as follows: James B. Brady, president; W. O. Jacquette, first vice president; John D. Hurley, second vice president; A. B. Holmes, secretary; C. E. Erikson, treasurer; A. Levedahl, mechanical superintendent. The board of directors consists of the following gentlemen: James B. Brady, W. O. Jacquette, John P. Hopkins, John D. Hurley, Simon Florsheim, John M. Glenn, J. J. McCarthy, C. E. Erikson, Louis B. Dailey. Mr. Simon Florsheim is chairman of the board of directors. The works of the company are equipped with the very latest improved machinery, and at present, has a capacity of about 100 pneumatic tools a month. The makers claim that the Thor pneumatic tools are in use in a large number of plants in all parts of the world, and are giving entire satisfaction.

The new Canadian-Mexican Steamship Line will begin operations on July 20, when the first steamer subsidized by the Canadian and Mexican governments will sail from Montreal to Mexican ports, touching at Havana. By the terms of contract with the Mexican government, boats may carry cargoes and passengers from Canada to Cuba, cargoes and passengers both ways between Mexico and Canada, but on northbound trips no freight may be taken from Cuba to Canada. The Mexican government objected to subsidizing a line that would be used to build up trade between Cuba and Canada.

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MANNING, MAXWELL & MOORE INCORPORATED

The firm of Manning, Maxwell & Moore was incorporated recently. The company is known as Manning, Maxwell & Moore incorporated and includes the allied manufacturing companies, the Shaw Electric Crane Co., the Ashcroft Manufacturing Co., the Consolidated Safety Valve Co., the Hayden & Derby Manufacturing Co., the Hancock Inspirator Co., and the United Injector Co. The corporation was formed under the laws of the state of New Jersey, and is established on a basis which is unique among commercial enterprises of its kind, having a paid up capital of $5,000,000. There is but one kind of stock, known as common, non-assessable. The officers of the new concern are: Charles A. Moore, president; John N. Derby, vice president; Martin Luscomb, vice president; Stephen B. Aller, vice president; Colby M. Chester, Jr., treasurer; J. H. Blue, assistant treasurer; Charles Arthur Moore, Jr., secretary, and Merle S. Clayton, assistant secretary. There is to be a board of 15 directors, among whom are some very prominent New York business men. The present directors are: Charles A. Moore, John N. Derby, Charles A. Moore, Jr., Colby M. Chester, Jr., J. Rogers Maxwell, Edmund C. Converse, Martin Luscomb, Stephen B. Aller, Alfred Brotherhood, Robert A. Bole, John G. Emery, Jr., James B. Brady, P. M. Brotherhood and A. J. Babcock. Business will be carried on at the home office of Manning, Maxwell & Moore, at 85, 87 and 89 Liberty street, New York, and through their branch offices in Boston, Philadelphia, Chicago, Cleveland, Pittsburg and St. Louis.

The firm of Manning, Maxwell & Moore was established in 1881, composed of Henry S. Manning, Eugene L. Maxwell and Charles A. Moore. Mr. Maxwell died about ten years ago, and Mr. Moore recently purchased Mr. Manning's entire interest in the business. The firm was remarkably successful from its inception, and has grown to be the largest concern of its kind in this country, if not in the world, while this combination just effected, with its ramifications and diversity of interests, is absolutely unparalleled in commercial history.

Of the several manufacturing companies involved in this consolidation, the Shaw Electric Crane Co., with works at Muskegon, Mich., are the manufacturers of the well-known Shaw electric traveling crane. The exhibit of this company received the grand prize at the Louisiana purchase exposition, and their works are the largest in the world devoted exclusively to the manufacture of traveling cranes.

The Ashcroft Manufacturing Co., whose works are located at Bridgeport, Conn., and whose business was established in 1851, are the largest manufacturers of steam gauges in the world. In addition to steam and pressure gauges, they manufacture the celebrated Tabor steam engine indicator, the Edson recording gauge, and an extensive line of pipe fitters' tools. This company was awarded the grand prize at the St. Louis exposition.

The Consolidated Safety Valve Co., whose works are also located at Bridgeport, are makers of the famous "Consolidated" safety valve, which is made under the original Richardson patents, and was the first successful "pop" safety valve ever produced.

The factory of the Hancock Inspirator Co. is located in Boston, Mass. This business, established in 1876, consists of the manufacture of the Hancock inspirators for the feeding of locomotive, marine, stationary and portable boilers. Over 300,000 of these instruments are in daily use. This company also manufacture Hancock, globe, angle 60-degree and cross valves, and are making a complete line of locomotive trimmings. The business of the Hayden & Derby Manufacturing Co. was established in 1888, and they have a factory in Boston devoted to the manufacture of "Metropolitan" injectors, of which there are over 150,000 in use. They also make the "H-D" ejectors and other jet apparatus. The Consolidated Safety Valve Co., the Hancock Inspirator Co. and the Hayden & Derby Manufacturing Co. all received gold medal awards for their exhibits at the St. Louis exposition.

CANADIAN SHIPPING NOTES

The Northern Belle is the name of the steamer which the French River and Nipissing Navigation Co. has placed on a route between Callander and Sturgeon Falls, calling at North Bay, Ont. The steamer carries passengers and freight.

The Dominion government has appointed W. A. Richardson to be secretary-treasurer and D. A. Smith a member of the pilotage authority of North Sydney, N. S.; and J. C. Bourmot to be a measuring surveyor of shipping at Port Hawkesbury, N. S.

G. C. Cook of Halifax, N. S., has purchased the steamer Santiago de Cuba, to which he proposes to give a British registry. The steamer carries 1,400 tons, and has accommodation for 20 passengers. It is intended to place her on a route from Halifax to West Indian points.

The Pioneer Navigation Co. is constructing a steamer on the Red River near Broadway, Man., for freight and passenger trade on the river. The hull measures 142 ft. long by 21 ft. beam, and she will have accommodation for 300 passengers and 200 tons of freight. She is being fitted for towing barges.

A report is current at Collingwood, Ont., to the effect that negotiations are in progress between the Canadian Shipbuilding Co. and the Collingwood Shipbuilding Co. for the purchase of the latter company's yard and business. Officers of the Canadian Shipbuilding Co. decline to say anything about the report.

The area of authority of the Harbor Master of Fort William, Ont., has been altered, the waters of the port now including the Kaministikwia river, with the McKellar and Mission channels; and the waters of Thunder Bay, extending to the six fathom line on the east, a line drawn due east from the boundary between Fort William and Port Arthur; and on the south by a line drawn due east from Whiskyjack point.

News has just been received of the burning, with loss of life, of the Northern Navigation Co.'s steamer, City of Collingwood, of Georgian Bay. The City of Collingwood was built at Owen Sound, 1893, her dimensions being: Length, 213 ft.; breadth, 34 ft.; depth, 12.6 ft.; tonnage—gross, 1,387 tons; register, 893 tons. She was a screw steamer and was fitted with engines of 107 I. H. P.

The recommendation of the committee appointed at the public meeting at Quebec respecting a Quebec-Great Britain line of steamers, is that a company be started to charter steamers for a fortnightly service. The Quebec Harbor Commissioners have been asked to be given the use of two berths—the Leyland shed, and the wharf where the Great Northern Ry. conveyer is situated, for a series of years, with exemption from harbor dues.

The Temagami Navigation Co. has been incorporated at Toronto for the purpose of placing steamers on the Temagami Lake, which is increasing in popularity as a tourist resort since the opening of the Temiskaming & Northern Ontario Ry. A. H. Jeffrey and J. J. Main of the Polson Iron Works, Toronto, are interested. The company has purchased the steamer Bobs from the Parry Sound Lumber Co., and the steam yacht Wanda from L. Gorton, Toronto, for this season's business.

D. W. Campbell, at one time manager for the Elder Dempster Co., in Montreal, and latterly superintendent of the Canadian Pacific Ry. Co.'s Atlantic steamers, has resigned. He has returned to the Elder Dempster Co.'s service. This company is now operating a service from Canada to South Africa, and one from Canada to Mexican ports. The latter service has just been inaugurated, the difficulty about calling at Cuban ports having been got over by arranging that the steamers shall not carry freight from Cuba to Canada.

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CHICAGO GRAIN REPORT

Chicago, June 20.—Last week's grain movement, as shown in the figures noted below, is some 1,000,000 bu. in excess of previous periods and rates established under fairly strong tone at basis 13¼ cents corn Buffalo and Georgian Bay. The all water routing to Montreal is likewise firm and quotable at 4 cents corn. The general cash demand for export and eastern milling account bids to continue the vessels under reasonably active request, though it is quite apparent rates must be further advanced in order to induce any noticeable call of extra capacity. The dock reports, however, account toward a very satisfactory condition in general handling, which factor proportions the Chicago trip to very fair advantage.

The weekly shipments as compiled by E. J. Fleming & Co. are as follows: Via all rail lines some 100,000 bu. wheat, 265,000 bu. corn, 723,000 bu. oats; via lake to Buffalo and other American ports of wheat 115,000 bu., corn 2,000,000 bu., oats 195,000 bu.; and lake routing to Canada points 450,000 bu. corn and 430,000 bu. oats.

Lake and rail shipments:

	This week.	Last week.	Same week last year
Wheat	234,718	164,873	263,735
Corn	2,705,811	2,348,193	2,244,407
Oats	1,356,609	922,639	671,184
Rye	463	9,162	12,264
Barley	32,115	33,000	26,128
	4,329,806	3,477,867	3,217,718

Shipments since Jan. 1, 1905:

		Same time last year.
Wheat	6,157,719	6,324,785
Corn	30,002,476	26,842,145
Oats	23,250,562	22,410,534
Rye	570,781	703,382
Barley	2,248,895	2,570,263
	71,230,433	58,911,109

Stocks of grain in private and public elevators:

	This week	Last week.	Same week last year
Wheat	1,775,000	1,960,000	2,915,000
Corn	2,830,000	3,477,000	6,440,000
Oats	3,180,000	3,434,000	1,325,000
Rye	115,000	122,000	453,000
Barley	28,714	22,714	130,000
	7,937,714	9,024,714	11,263,000

WEST BOUND CARGOES SCARCE AT BUFFALO

Buffalo is arriving at a new era as far its lake commerce is concerned. Vessel owners are finding it extremely difficult to get upbound cargoes out of that port. Comparatively little hard coal has been shipped this season, and even if the shipments were normal, less than half of the tonnage trading to Buffalo will be able to get west bound cargo out of there. Little, if any, iron ore was received at Buffalo prior to 1885. In that year the receipts aggregated 7,162 tons, which were increased in 1900 to 1,615,000, and in 1904 to 2,230,000 tons. The normal hard coal shipments out of Buffalo are about 2,500,000 tons per year. With the advent of the Lackawanna Steel Co., at Stoney Point; the Buffalo & Susquehanna Steel Co., and the new ore storage dock of the Pennsylvania Railroad Co., on the new Union Canal, vastly more tonnage trades into Buffalo than can be accommodated with cargoes out of that port. In addition to the ore receipts the grain east bound brings a vast tonnage outside of the package freighters which require cargoes, but cannot get them on account of the changed conditions. Buffalo has not enough business west bound to take care of the boats trading there east bound.

The construction of the new Black Rock Canal to Tonawanda, and the 1,000-ton barge canal, from Tonawanda across New York State to the Hudson, will greatly increase the water commerce at the Buffalo gateway, but it is doubtful if the nature of the merchandise handled west on the new barge canal will in any way materially assist the large freighters trading into Buffalo since that port became a factor in the iron ore trade on the lakes. Another factor is the size of the modern lake freighters. Shippers will not take a 10,000-ton boat when there are any number of 5,000 and 6,000-ton boats awaiting cargoes.

GRAIN SITUATION AT DULUTH

Duluth, June 20.—An interesting fact connected with the wheat situation at the head of the lakes is that in the 1,175,000 bu. of wheat on hand this week there are 1,090,000 bu. special bin, that is wheat of no grade held by the owners without state inspection. There is no No. 1 hard, no No. 2 northern, now the contract grade, no No. 4, and neither rejected, no grade, or condemned, and no western nor winter wheats. Practically all this wheat is held by local milling concerns, which have a small proportion, and by the firm of A. D. Thomson & Co, large shippers. The latter are shipping steadily after sales in the east, and are reducing the stocks here materially. There are still nearly 6,000,000 bu. flax seed, and about 900,000 bu. oats The advance reports as to flax acreage for the present year show that there is an increase of something like 33 per cent in the northwest, and this will probably make such a crop as the United States has never seen. The price of seed is very high, $1.25 for this fall crop, and if it stays there the farmers of the flax regions of Minnesota and the Dakotas will be buying fast horses this year. It is difficult to see where this flax is to go, if it comes along as well as present crop indications would promise.

TRANSFERRING A BRIDGE

Duluth, June 20.—The old Duluth & Winnipeg bridge at New Duluth, on the lower St. Louis river, may be moved to Houghton to serve there until such time as a new steel drawbridge can be built for the river there. The firm of Whitney Bros., of this city, is now figuring on cutting the old bridge in two and loading it on scows for transportation to Houghton. The plan seems rather far fetched, but this firm is actually figuring in good faith on the matter and may move the structure. This bridge was built in 1892, is a steel draw of 275 ft. total span, and has not been in use for some years. It has never been dismantled, but the road leading to it has been torn up. It now belongs to the Great Northern railway.

STEAMER CITY OF COLLINGWOOD BURNED

Three lives were lost in a fire that totally destroyed the passenger steamer City of Collingwood at Collingwood, Ont., on Monday morning. The escape of two deck hands and a fireman was entirely cut off and they perished in the flames. The fire was discovered at two o'clock and spread so rapidly that the crew had to escape in their night clothes, several being compelled to jump overboard. The flames spread to the freight shed of the Grand Trunk Railway which was also burned. The City of Collingwood had just arrived in port having released the steamer Britannic from Campbell's rock where she had stranded in a fog. The steamer was valued at $80,000 which was covered by insurance.

The Isthmian Canal Commission is asking for bids for a tug boat to be 102 ft. long, 25 ft. 6 in. beam and 8 ft. deep, to be of wood, iron or steel. Bids will be opened on June 30.

The Jersey Central Railroad has contracted for two more large ferry boats to be built by the Harlan & Hollingsworth Corporation, Wilmington, Del

The New England Ship Building Co., Bath, Me., has received a contract to build a four-masted schooner 185 ft. long, 38 ft. beam and 13½ ft. deep for Capt. J. W. Quillan.

T. A. Crowell, Boston, Mass., has awarded contract to Oxner & Story, Essex, Mass., for a schooner 125 ft. long, 24 ft. beam and 6 ft. deep.

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RIVER NEWS

The Ohio & Mississippi River Packet Co., which will operate a line of steamers between Cincinnati and New Orleans, has been organized with a capital of $150,000. A contract has been awarded the Howard Ship Building Co., Jeffersonville, Ind., for the construction of a passenger and packet steamer 300 ft. long, 64 ft. wide and 12 ft. in the hold. She will have 165 state rooms, many of which will be connecting, and will be the largest steamer on the rivers when completed. Her equipment will consist of eight boilers and two engines. Her stern wheel will be so constructed that at any time her owners desire they can substitute side wheels. Captain Morris Huffman, Marietta, O., is general manager of the new company.

The war department has set aside $56,000 to cover the cost of the surveys to be made of the Ohio river from Pittsburg to Cairo, Ill., with a view of determining whether the Ohio should be canalized to a depth of 6 or 9 ft. The money for the examination is to be taken from the item of $300,000 carried in the rivers and harbors appropriation bill passed by Congress set aside for extending the harbor of Pittsburg to the State line.

A decision of importance to river interests has just been rendered by Secretary of War Taft. He has decided that the water power created by government dams, built as aids to navigation is the property of riparian owners. The only limitation to the rights of owners of river frontage in using water power is that they must not interfere with the navigation or the improvement of a navigable stream. This limitation not only covers the present improvement of a stream, but also precludes the assessment of damages against the government on account of future improvements of the river. The occasion for issuing this order was the application of H. P. Dilworth, Charles A. Jamison and S. H. Robinson of Pittsburg for the right to use the water power created by dam No. 3, Allegheny river. Water power will be utilized in the operation of an electric plant that is to be built on the north bank of the river.

OBITUARY

Thomas R. Morgan and Mr. Charles H. Wellman of the Wellman-Seaver-Morgan Co. of Cleveland were both killed in the appalling accident of the Twentieth Century Limited, the new eighteen hour train, on the Lake Shore railway near Mentor on Wednesday evening of this week. The accident was caused by an open switch which had been locked open by some party unknown. An eastbound flyer had passed the switch forty-five minutes previously in safety and no train had passed since. Mr. Morgan was the second vice president of the Wellman-Seaver-Morgan Co. and was one of the most distinguished engineers in the country. Mr. Charles H. Wellman was the general manager of the company and of international prominence as a manufacturer. Mr. A. L. Rogers of the Platt Iron Co. of New York City was also killed in the wreck and also a number of others more or less prominent in business and manufacturing circles, including A. C. Head of London, the English representative of the Otis Steel Co. of Cleveland and the Wellman-Seaver-Morgan Co.

Chief Engineer James W. King of the United States navy, retired, died at his home in Philadelphia last week. He was born in Maryland and was appointed as third assistant engineer in the navy on Sept. 2, 1844. He participated in the war with Mexico and was employed on all the first small steamers owned by the navy with the exception of the Fulton. In 1855 he superintended the construction of the machinery for the Wabash, one of the largest ships then in the navy and served in her on her first cruise. As chief engineer of the navy yard he organized the engineering department in 1858. He retired from the office of engineering chief in 1873.

Capt. Henry H. Wallace for thirty years master of lake vessels died at Lorain last week. Capt. Wallace was born in Ireland in 1828. He came to the United States in 1850 and went almost directly to Lorain where he engaged in shipbuilding. Later he became master of one of the vessels that he had built.

Capt. Robert Gilbertson died at Cleveland last week. He had been in the employ of the Midland Navigation Co. for eighteen years but retired about a year ago. He was sixty-two years old.

PINTSCH GAS IN BUOYS

One of the most satisfactory forms of lighting the buoys and beacons throughout the world is Pintsch gas and it is interesting to note that there are now 1,516 buoys and beacons equipped with this system of lighting. It has long been a popular form of lighting railway trains and there are now 134,855 cars and 6,191 locomotives so lighted. Following are the figures classified according to countries:

	Cars.	Locomotives.	Gas works.	Buoys and Beacons.
Germany	46,200	5,930	70	140
Denmark	45	....	3	21
England	20,500	....	80	280
France	8,000	....	20	250
Holland	3,800	5	12	100
Italy	1,570	....	5	20
Switzerland	410	2	1	....
Austria	5,525	....	15	5
Russia	4,000	170	22	30
Sweden	800	53	6	5
Servia	220	....	1	....
Turkey	120	....	...	....
Bulgaria	117	....	...	....
Egypt	200	....	4	80
Canada	600	....	4	243
Brazil	1,400	31	2	45
Argentine	1,200	....	13	10
Chili	50	....	2	....
Australia	3,000	....	10	40
India	11,600	....	19	....
United States	25,200	....	71	208
Japan	150	....	2	35
China	.....	....	1	25
Mexico	150	....	1	....
Total	134,855	6,191	364	1,516

A log raft of 1,000,000 ft of lumber is to be towed from the Pacific to Shanghai during the summer. Similar rafts have been towed from the Columbia river to San Francisco but this will be the first instance on record where one has been towed across the Pacific. Ship owners look upon these rafts with considerable disfavor because if they break up they become a considerable menace to navigation.

The Hudson River Day Line is to build a new steamer 400 ft. long, 82 ft. beam and 14 ft. deep for next season's delivery. T. S. Marvel of Newburg will build the hull, W. A. Fletcher & Co of Hoboken, N. J. will build the engine and the New York Ship Building Co., Camden, N. J., will supply the boilers. John Englis & Son of Greenport, New York, will do the joiner work.

The Allan liner Virginian, one of the new turbine boats, has smashed her own previous record from land to land, and has distanced all other records by the southern route between Moville and Cape Race. Leaving Moville at 2 p. m. on Friday she reached Cape Race at 9 o'clock Tuesday night, making the trip in four days and seven hours. This beats her time of last trip by about five hours and that of the Bavarian of the same line by several hours more. The success of the new style boat is pleasing to all Canadians and a source of gratification to the Allan line, which by becoming a pioneer of the turbines on Atlantic steamers is rewarded by increased speed at an expenditure very much lower.

The plans of Major J. C. Sanford, government engineer with charge of harbor work of Philadelphia, for dredging the 30-ft. channel in the Delaware river, have been officially approved by the war department and proposals for bids will be advertised for within a few days.

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ITEMS OF GENERAL INTEREST

The tug Wm. Rowland was launched from Roach's shipyard, Chester, Pa., last week. The tug is the property of the Old Dominion Steamship Co., New York.

The entire business of the American Fisheries Co., including thirty-seven steamers has been purchased by a syndicate of New York capitalists.

The committee on foreign and coastwise commerce of Philadelphia has protested against Mayor Weaver's decision to build only one ice boat when two were originally intended to be built.

It has been announced by the Newport News Shipbuilding & Dry Dock Co. that a new dry dock will be built by the company at Newport News. The company also proposes to amplify its plant in other ways.

The Pusey & Jones Co., Wilmington, Del., are very busy on repair and new work. The company is building the screw ferry boat Bristol for the Newport & Providence Railway Co. They are also building a steel hull dredge for New York interests. The machinery for the new revenue cutter for the coast of Maine is well under way.

The Panama Canal Commission is buying rolling stock for the railroad crossing the isthmus and has ordered twenty-four locomotives, 500 freight cars and six passenger cars. The locomotives will be built at the Schenectady works of the American Locomotive Co., while the American Car & Foundry Co. will secure the order for cars.

Cramps at Philadelphia have secured a contract to build two twin screw steamers for the New York & Cuba Mail Steamship Co. commonly known as the Ward Line. These vessels will be 400 ft. long, 50 ft. beam and 30 ft. deep and will be equipped with triple expansion engines with cylinders 28, 46 and 76 in. diameter by 42 in. stroke.

For some time past the navy department has had under consideration the expediency of installing range finders in the fighting tops of war vessels in the place of the one-pound guns which have hitherto occupied these places. These range finders are first to be installed in the fighting tops of the Louisiana and Alabama.

Bids for the excavation of the harbor of Colon were opened in the rooms of the Isthmian Canal Commission at Washington last week. The bidders were George W. Catt of New York, The North American Dredging Co. of San Francisco, Cal., and Michael J. Davy of Brooklyn. The bids were somewhat complicated and it will require some figuring to determine which is the lowest and the best.

The Panama Railroad Steamship Co. has chartered the Savannah Line steamer City of Savannah for a term of three months with an option for renewal. The City of Savannah, which was formerly the Grand Duchess, was built in 1896 by the Newport News Ship Building & Dry Dock Co. for the Plant Steamship Co. She is a twin screw steamer 380 ft. long, 47 ft. beam and 28 ft. deep. Her engines are 6,500 I. H. P. and she can develop a speed of 16½ knots an hour.

The James Clark Co., Baltimore, has been awarded the contract for repairs to the City iceboat F. C. Latrobe. The repairs consist of three specifications: To the boiler and machinery, to the starboard quarter smashed by collision last winter with the tug Imperial, and to the port quarter smashed last winter by collision with the British steamship Fernfield. The Clark company's bid was a total of $39,451, as follows: Boiler, $37,051; starboard side, $300; port side, $1,200. Other bids were as follows: Harlan & Hollingsworth Corp., Wilmington, Del., boiler $43,945; starboard $425; port $1,890—total, $46,660. Maryland Steel Co., boilers $38,200, starboard $300, port $1,000—total, $39,600. E. J. Codd & Co., boilers $37,841, starboard $425, port $1,430—total, $39,696.

Preliminary plans for a new revenue cutter for service on Pamlico and Albermarle Sounds, North Carolina, call for a vessel not to exceed 150 feet in length, with a draught not to exceed 5 ft. Twin screw triple expansion engines are recommended, with two water-tube boilers of the Babcock & Wilcox type, and the vessel must be able to sustain a speed of 12 knots for six consecutive hours. The plans provide fully for the necessary auxiliaries, such as pumps, boats, electric lights and fans, ventilation, water supply, telephones, wireless system, etc. The armament recommended is a 3-pounder rapid-fire gun on the forecastle, of latest type, and two Colt's automatic guns, mounted on the rails on each side of the quarter deck. The former for enforcing her authority for stopping vessels, and the latter for use in defending the government buildings, etc., in case of attacks by mobs or rioters. It is recommended that a field carriage be provided for one of the Colt guns for use on shore duty, parades and drills, and twenty-four rifles and revolvers and the necessary equipment therefor.

The plans being perfected for the battleships Michigan and South Carolina contemplate the use of a battery of ten 8 in. guns in addition to the main battery of four 12-in. guns. The ten 8-in. gun feature will make them the most powerful battleships in the world, and by several hundred pounds of broadside metal ahead of the best ships in the British navy. The tonnage of the new American ships will about equal the new British vessels of the King Edward VII. and African class. Those vessels displace between 16,000 and 17,000 tons, and are about 425 ft. long. They carry four 12-in., four 9 2-10-in., ten 6-in. and twenty-eight smaller guns. As the South Carolina and the Michigan will carry at least eight of the latter guns, the new warships would be a great deal more powerful than the King Edward VII. and African type. The adding of a third screw to the new battleships, which calls for the addition of another engine, is reported to have been definitely decided upon by the bureau of construction. This system, which was introduced into the navy by Rear Admiral Melville, although looked on with great disfavor by foreign naval constructors, has proved a great success on the Columbia and Minneapolis. One of its advantages is that in cruising great economy is attained, in that when only a moderate speed is required the central engine alone is used. If a high rate of speed is desired the two wing engines, and if necessary, all three can be operated.

PERSONAL

Mr. Calvin B. Orcutt, president of the Newport News Ship Building & Dry Dock Co., has sailed for England.

Mr. W. E. Gerard has been appointed general manager and Frank Martin general superintendent of the Union Ferry Co. of New York.

Mr. George Y. Wisner of Detroit, member of the Deep Waterways Commission, was in Cleveland this week attending the meeting of the American Society of Civil Engineers.

Mr. Charles P. Weatherbee of the Bath Iron Works, Bath, Me., has gone to Montreal to take passage on one of the turbine steamers of the Allan Line. In Great Britain he will study the steam turbine for marine propulsion.

John F. Wallace, chief engineer of the Panama Canal, is going to Washington to confer with Secretary Taft. It is understood that there is again some question of authority agitating the commission and Mr. Wallace wants his duties defined.

Capt. Cyrus H. Sinclair who resigned the general management of the Great Lakes Towing Co. on Feb. 1 last has been appointed wrecking master for the Inland Lloyds' with headquarters at Detroit.

Mr. C. M. Burt, general passenger agent of the Central Railroad of New Jersey, announces that on June 25 the company's new ferry with terminal facilities at the foot of West Twenty-third street will be opened. The ferry service between Jersey City and Whitehall street will be discontinued.

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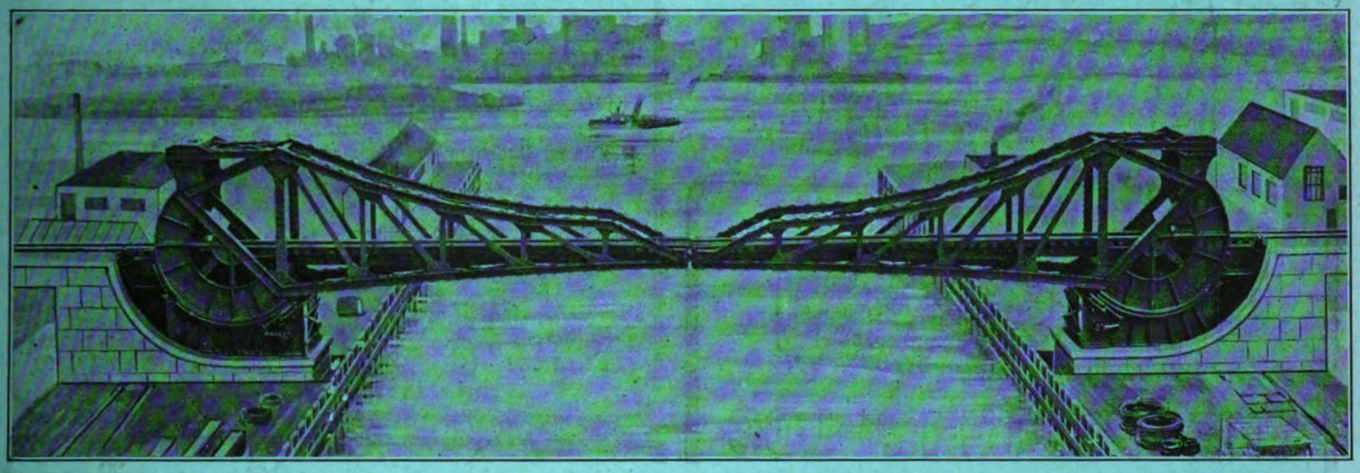

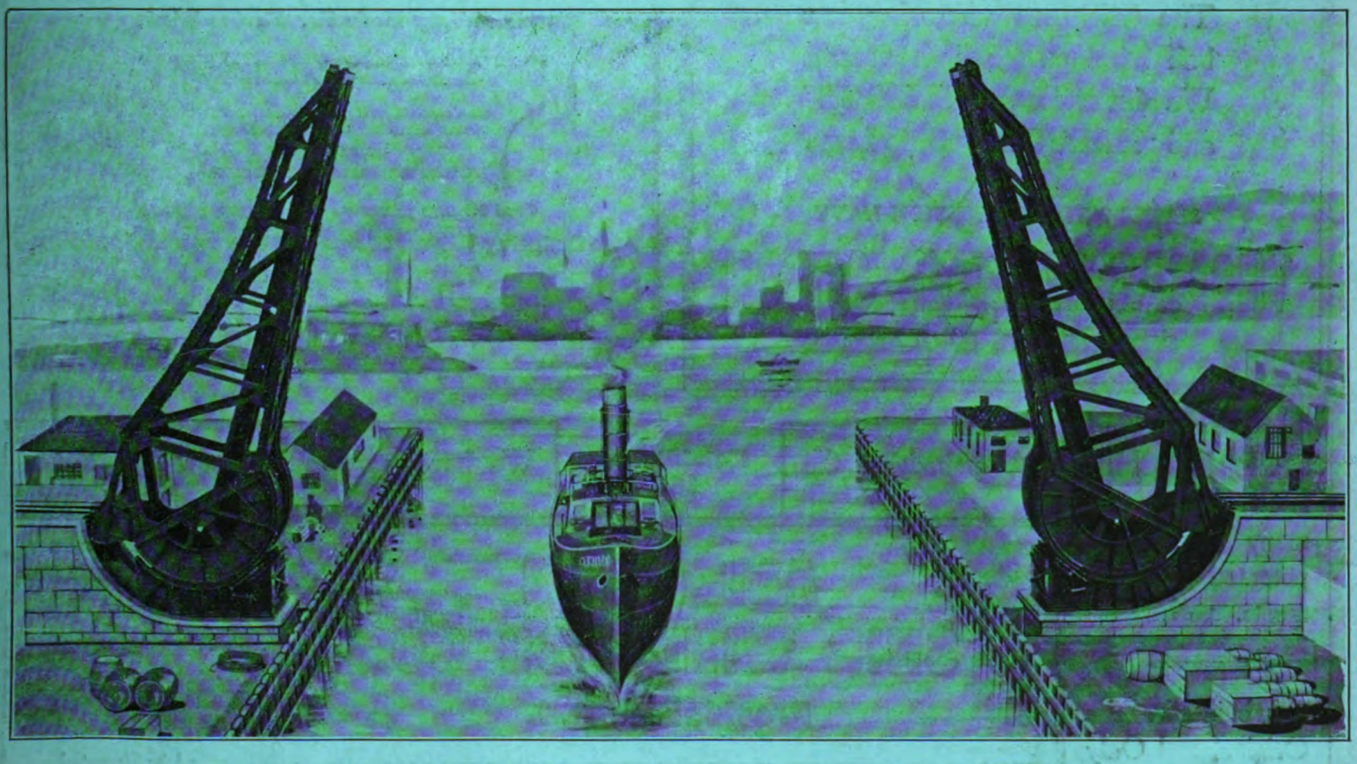

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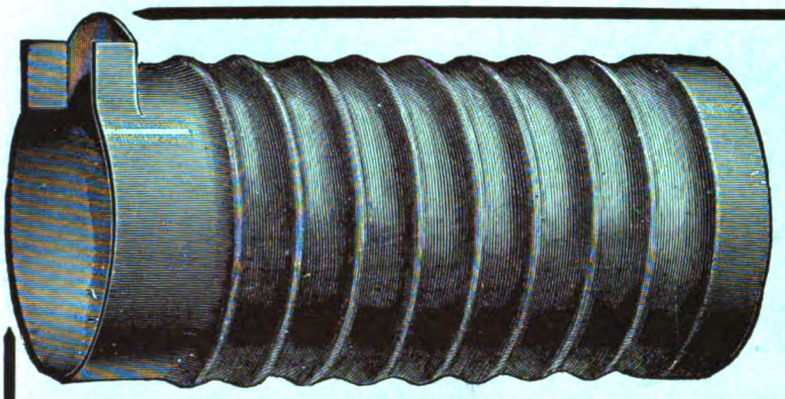

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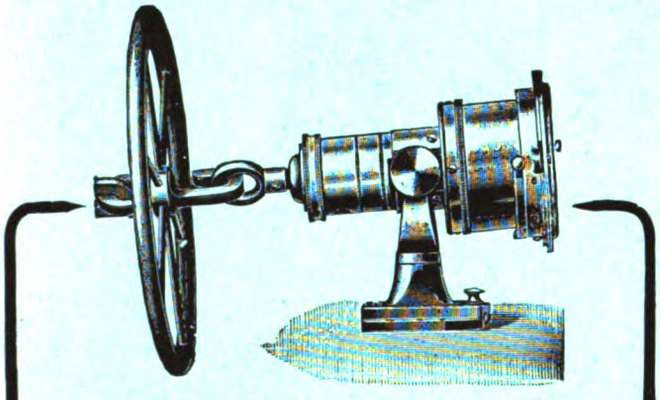

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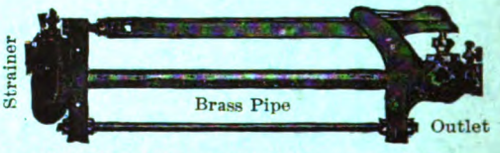

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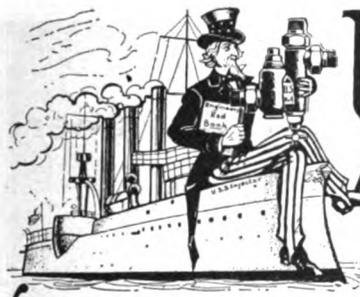

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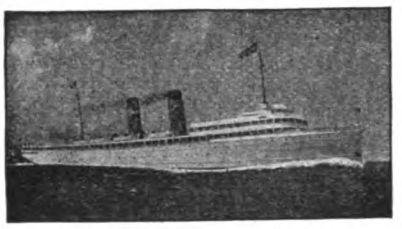

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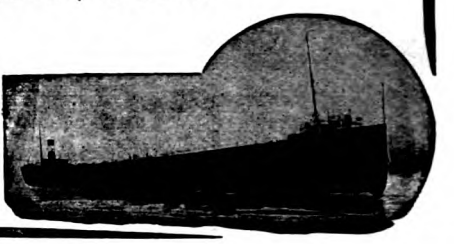

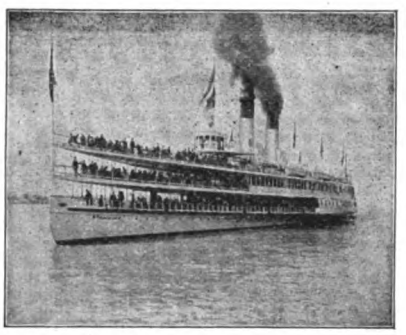

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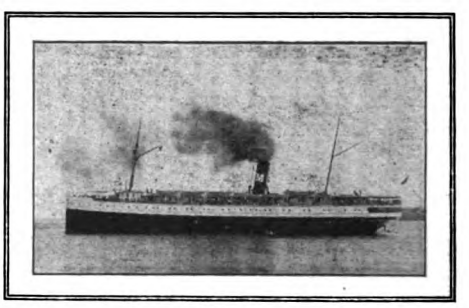

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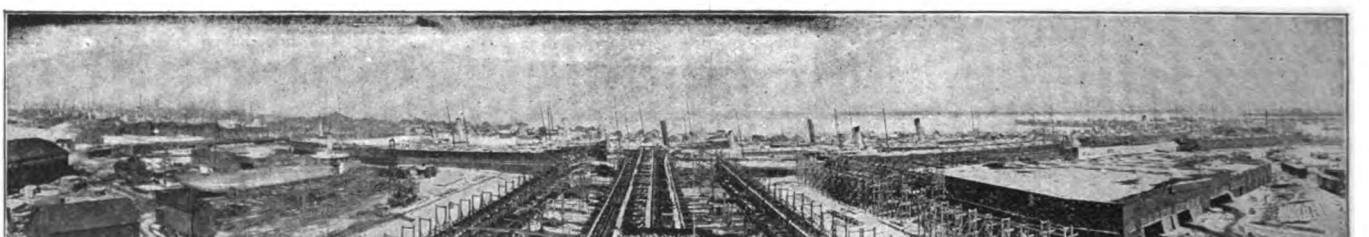

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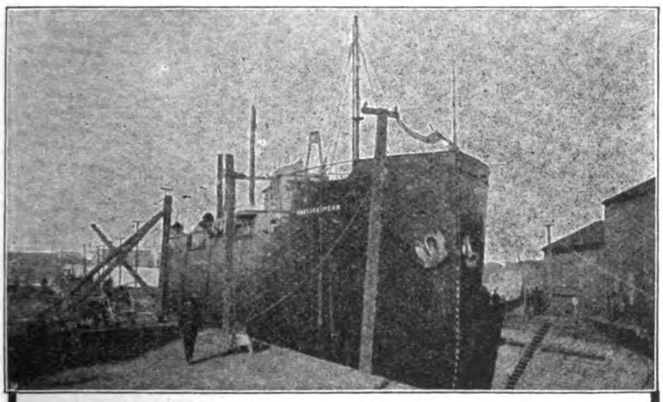

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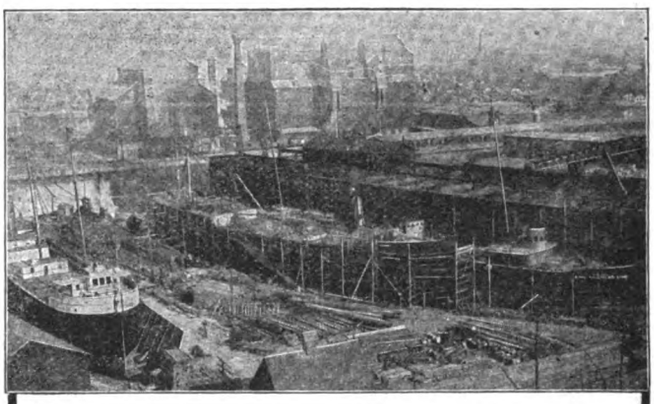

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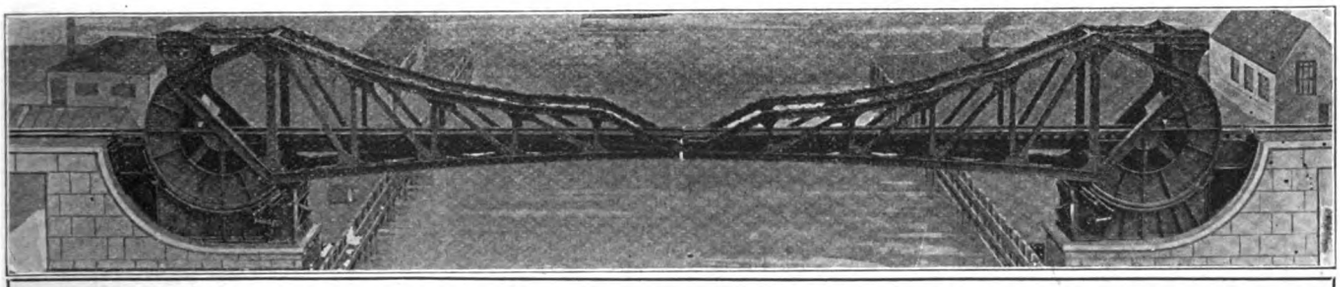

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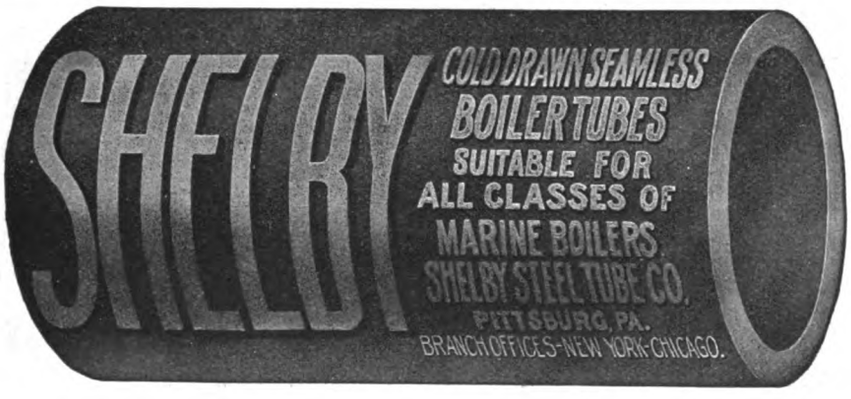

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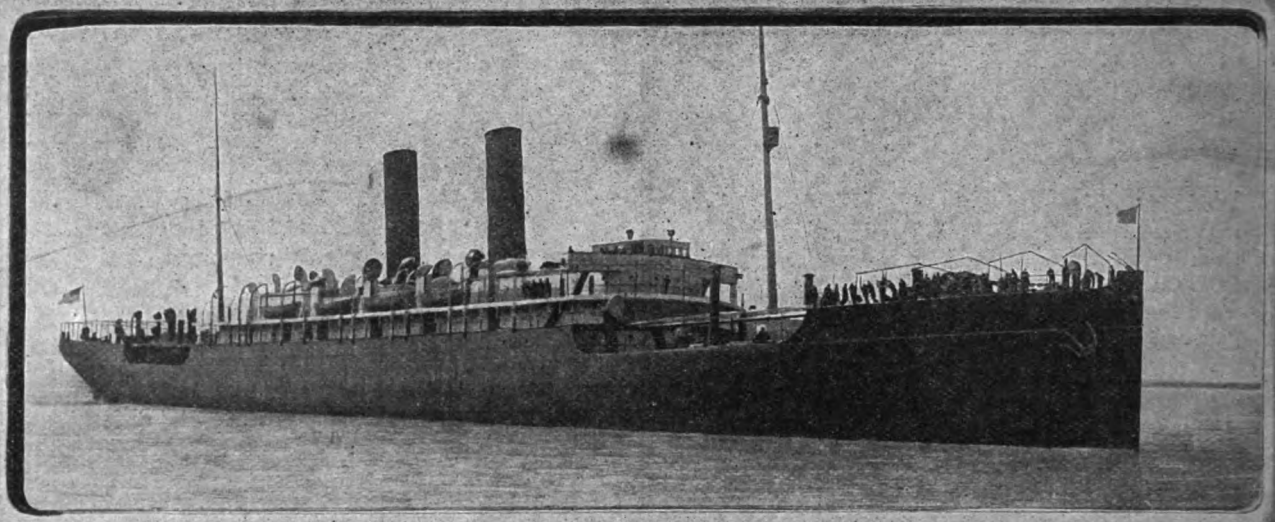

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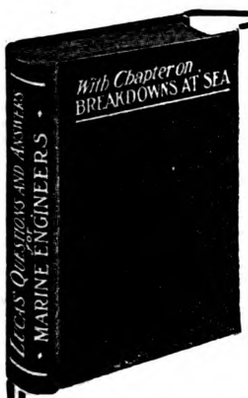

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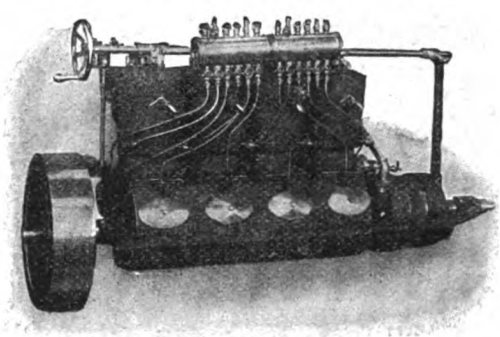

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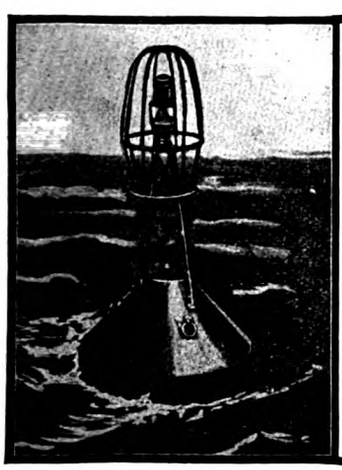

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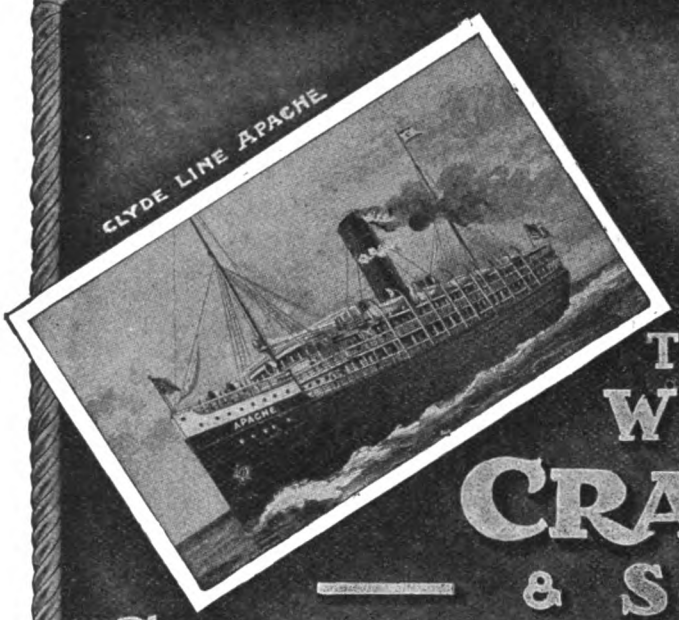

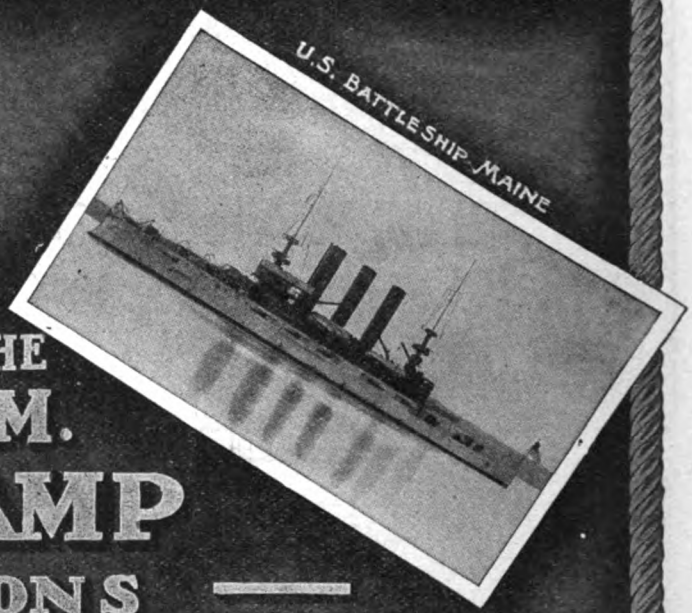

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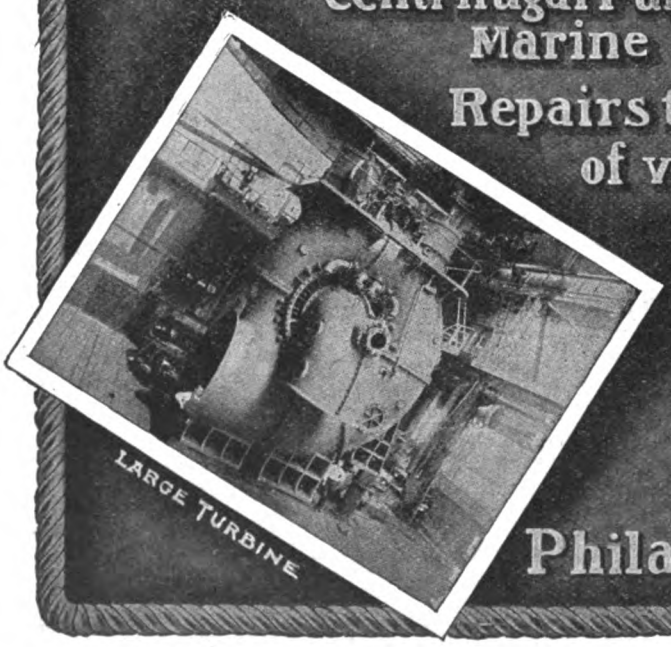

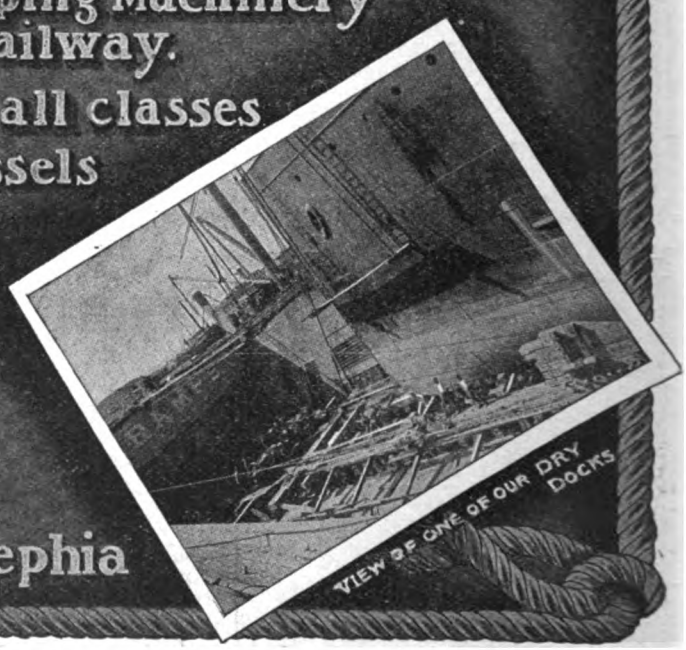

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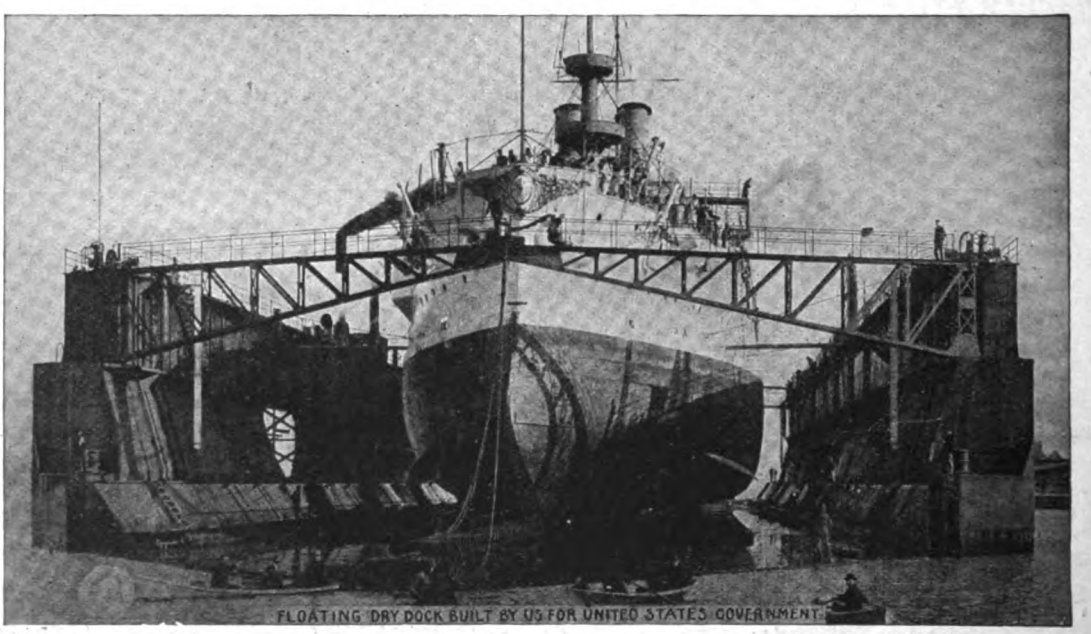

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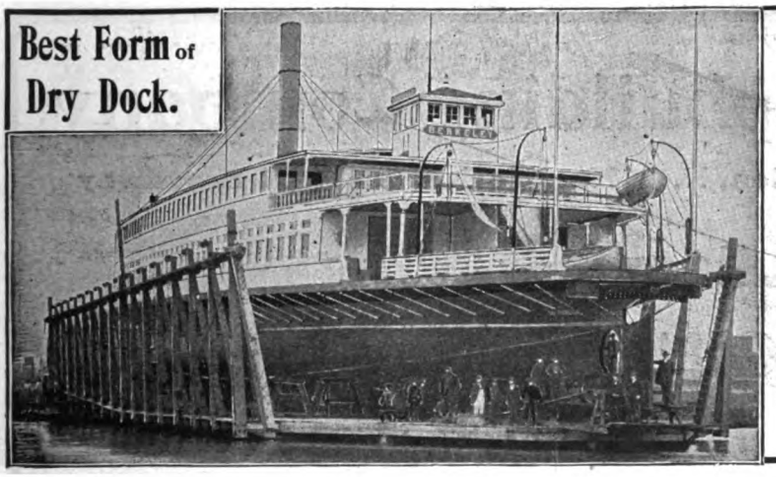

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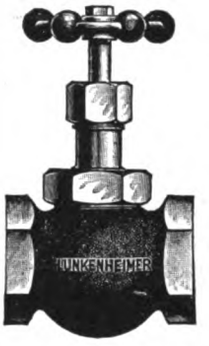

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GASOLENE MARINE ENGINES
Suitable for all Boats from 3½ to 200 H.P.
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Of all kinds and sizes, and for all purposes, especially for ship use.
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New York Shipbuilding Company

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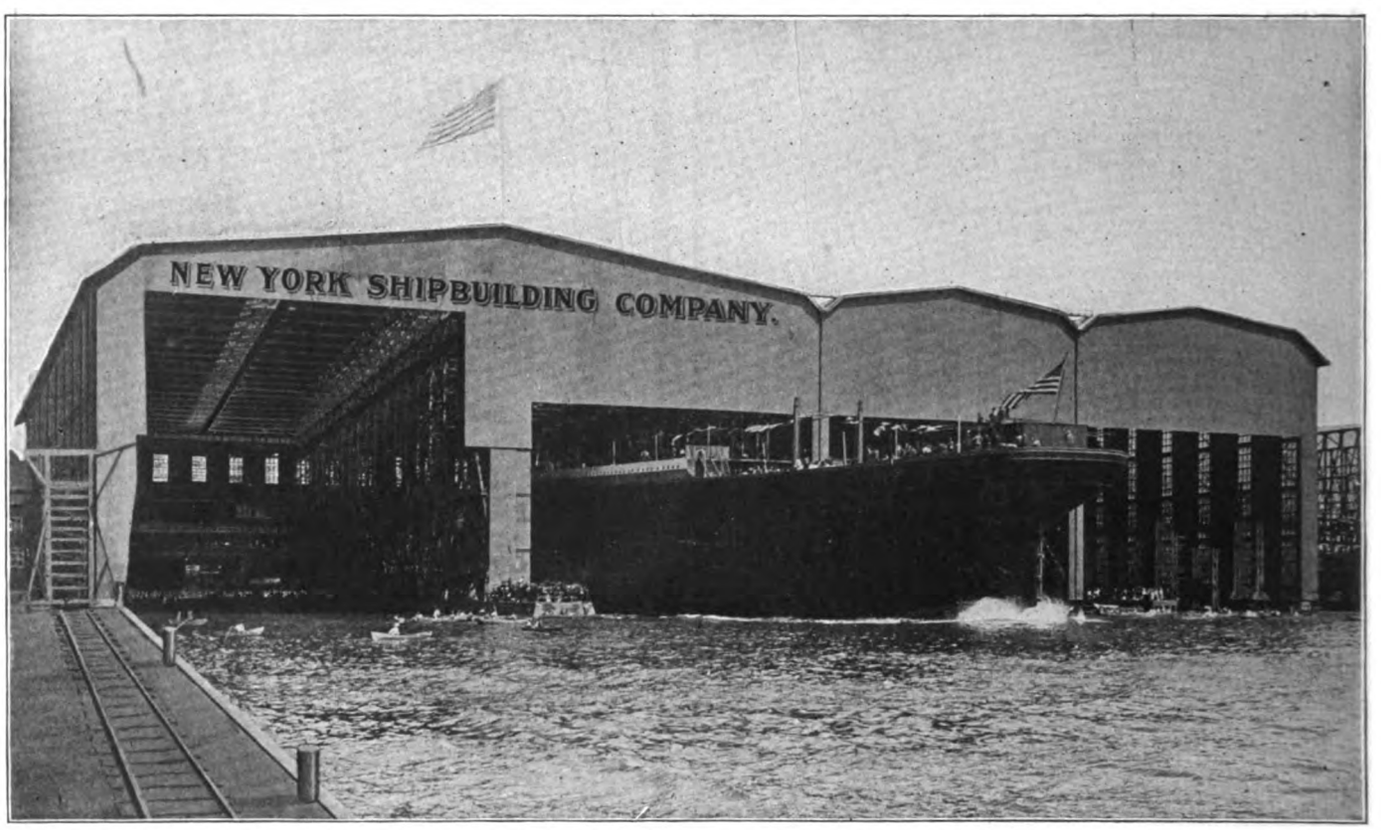
Builders of

SHIPS — ENGINES — BOILERS
HEAVY MACHINERY



Launch of "Mongolia," Pacific Mail S. S. Co., July 25, 1903.
615 feet long, 65 feet beam, 51 feet deep.

Best Facilities for Repair Work

Pneumatic and Electric Tools;
ample wharfage accomodation.

100 ton crane.

Repairs done under shelter.

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Commissioners' Sale

of the Shipbuilding Plant and other property of the William R. Trigg Co.

By N. W. BOWE & SON, Real Estate Auctioneers, Richmond, Va.

By virtue of a decree of the Chancery Court of the City of Richmond, Virginia, entered on the 23rd day of May, 1905, in the suit of S. H. Hawes & Co. vs. William R. Trigg Company et als., the undersigned, who were appointed Special Commissioners for that purpose, will proceed to sell, by public auction, on the premises, Richmond, Virginia, to the highest bidder, on

Monday, the Tenth Day of July, 1905, at 10 o'clock, a. m.

free of all liens and encumbrances whatsoever, except the easements and burdens hereinafter mentioned, all and singular the following estates, lands, properties, rights, privileges, and franchises, to-wit:

All that certain lot or parcel of land, with the buildings and improvements thereon erected, comprising the ship yards, ship building plant, boundaries, shops, railways, manufactories, offices, piers, wharves and docks of the William R. Trigg Co., situate in the city of Richmond, Virginia, more particularly described in two certain deeds of trust made by the William R. Trigg Co. to the Commercial Trust Co., of Philadelphia, trustee, dated June 1, 1901, and to the Richmond Trust & Safe Deposit Co., trustee, dated June 14, 1902, respectively.

The property will be first offered in parcels, as follows:

FIRST—The Richmond Dock, with all rights, easements, privileges and appurtenances thereto belonging, including the franchises of the Richmond Dock Co., together with so much real estate not covered by water as is necessary and appurtenant to its use, as set out and defined in deed dated the first day of June, 1901, from the Chesapeake & Ohio Railway Co. to the William R. Trigg Co., recorded in the clerk's office of the chancery court of the city of Richmond, deed book 171-A, page 245, and subject to the burdens and obligations fixed in said deed.

SECOND—Lot No. 1, with the two (2) office buildings thereon:

Lot No. 2, with the machine shop thereon, together with all the machinery, shafting, motors, cranes and hand and small tools now contained therein;

Lot No. 3, with the pattern shop thereon, together with all machinery, shafting, motors and hand and small tools now contained therein;

Lot No. 4, with the foundry building thereon, together with all machinery, shafting, motors, cranes, cupolas and hand and small tools now contained therein;

Lot No. 5, with the Smith shop thereon, together with all machinery, shafting, motors, cranes and hand and small tools now contained therein;

Lot No. 6, with the bending shed and anglesmith shop thereon, together with all machinery, shafting, motors and hand and small tools now contained therein;

Lot No. 7, with the mold loft thereon, together with all machinery, shafting, motors and hand and small tools now contained therein;

Lot No. 8, with the shipfitters' shed thereon, together with all machinery, shafting, motors and hand and small tools now contained therein;

Lot No. 9, with the carpenter and joiner shop thereon, together with all machinery, shafting, motors and hand and small tools now contained therein;

Lot No. 10, being a vacant piece or parcel of land containing three (3) acres, more or less, lying between the Smith shop and the bending shed;

Lot No. 11, being all of the unoccupied real estate lying east of lot No. 9, and containing fourteen (14) acres, more or less, on which said lot is located a launching basin and ship lock.

The exact location, together with their metes and bounds, of the aforesaid tracts of land will appear from the plats in the possession of the undersigned special commissioners and the auctioneer, access to which is open to the public, and blue prints of which will be furnished to any party applying for the same.

THIRD—The said special commissioners will then proceed to offer separately each of the aforesaid lots of land, with the buildings thereon as above indicated, *without* the machinery, tools, etc., contained therein, but with the appliances for electric lighting, wiring for power, automatic sprinklers and heating appliances.

FOURTH—The machinery, shafting, motors, cranes and hand and small tools contained in each of the aforesaid buildings in separate parcels, and distinct from the buildings.

FIFTH—All cranes, cableways, shear legs, derricks and other machinery and yard equipment outside of the aforesaid buildings, including a floating machine shop and a floating derrick.

SIXTH—All of the real estate comprising the plant of the William R. Trigg Co., except the dock with its appurtenances as above described, containing about 30 acres, more or less, together with the buildings thereon.

All of the above real estate, including the aforesaid dock, is sold subject to certain easements, rights, licenses, and privileges reserved by the Chesapeake & Ohio Railway Co. in two certain deeds conveying portions of the aforesaid property to said William R. Trigg Co., dated the 1st of June, 1901, and recorded in the clerk's office of the chancery court of the city of Richmond, in deed book 171-A, pages 245 and 258, and subject to certain easements, rights, licenses and privileges set out in two certain deeds between said William R. Trigg Co. and the Southern Railway, each dated the 21st day of November, 1904, recorded in the aforesaid clerk's office in deed book 183-B, pages 315 and 320.

SEVENTH—The said special commissioners will then proceed to offer as a whole the aforesaid land, dock, buildings, machinery, fixtures, equipment and property of every sort, kind and description above referred to, reporting to the court for its acceptance or rejection, the bid or bids aggregating the largest amount of purchase money.

TERMS—The terms of said sale, in the event that the said property is sold as a whole, are as follows: $50,000 in cash, of which $10,000 shall be paid to the said special commissioners by the purchaser or purchasers on the date of said sale, and $40,000 when said sale shall have been confirmed by the court; the balance of the purchase money on equal credits of one, two and three years, the purchaser to execute negotiable notes, bearing interest from the date of the confirmation of said sale, for the deferred payments; with the right in the purchaser to pay the whole amount of purchase money in cash, and to anticipate the due date of any or all of said notes. The title to the property to be retained by the court until the whole of the purchase price is paid, and a deed directed to be executed to the purchaser.

If sold in parcels, then the following are the terms: As to all articles of personal property, or property removable under said decree, all cash; as to the real estate, or any parts thereof, one-fourth of the purchase price in cash, and the balance on equal credits of one, two and three years, the deferred payments being evidenced by purchaser's notes, bearing interest from date of confirmation of sale, with the right in the purchaser to anticipate the due date of any or all of said notes, and title to be retained until the entire purchase money is paid and conveyance ordered by the court.

For further information apply to either of the undersigned Special Commissioners or to the Auctioneer.

BEVERLEY B. MUNFORD
LILBURN T. MYERS
} Special Commissioners.

The bond required of the Special Commissioners by the above named decree has been duly executed.

CHARLES O. SAVILLE,
Clerk of the Chancery Court of the City of Richmond.

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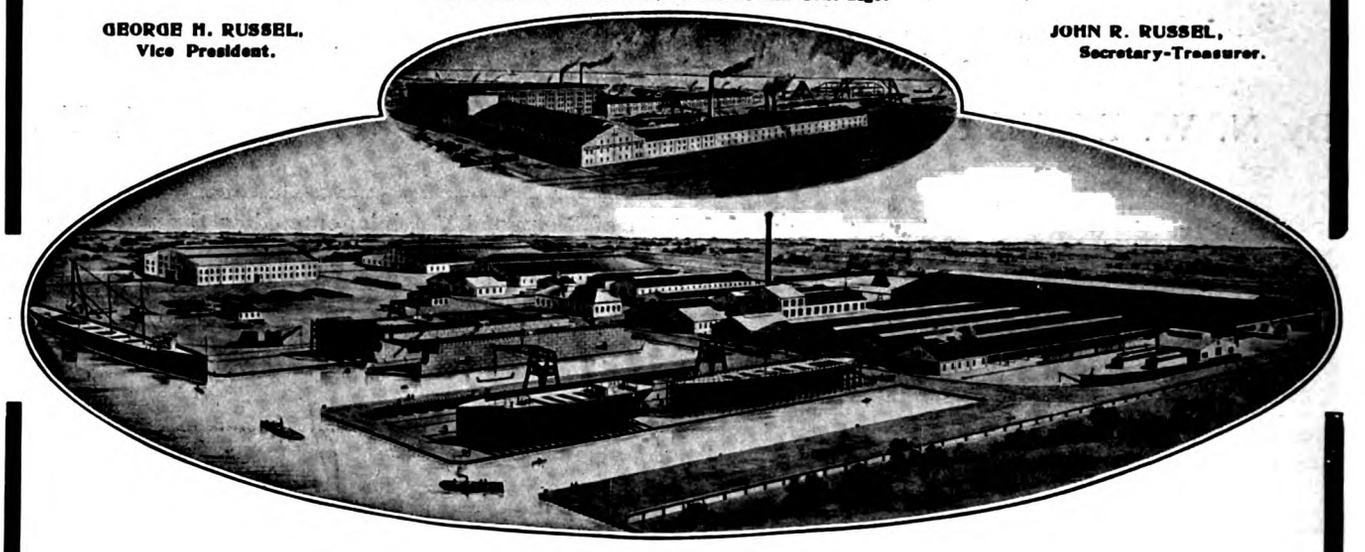
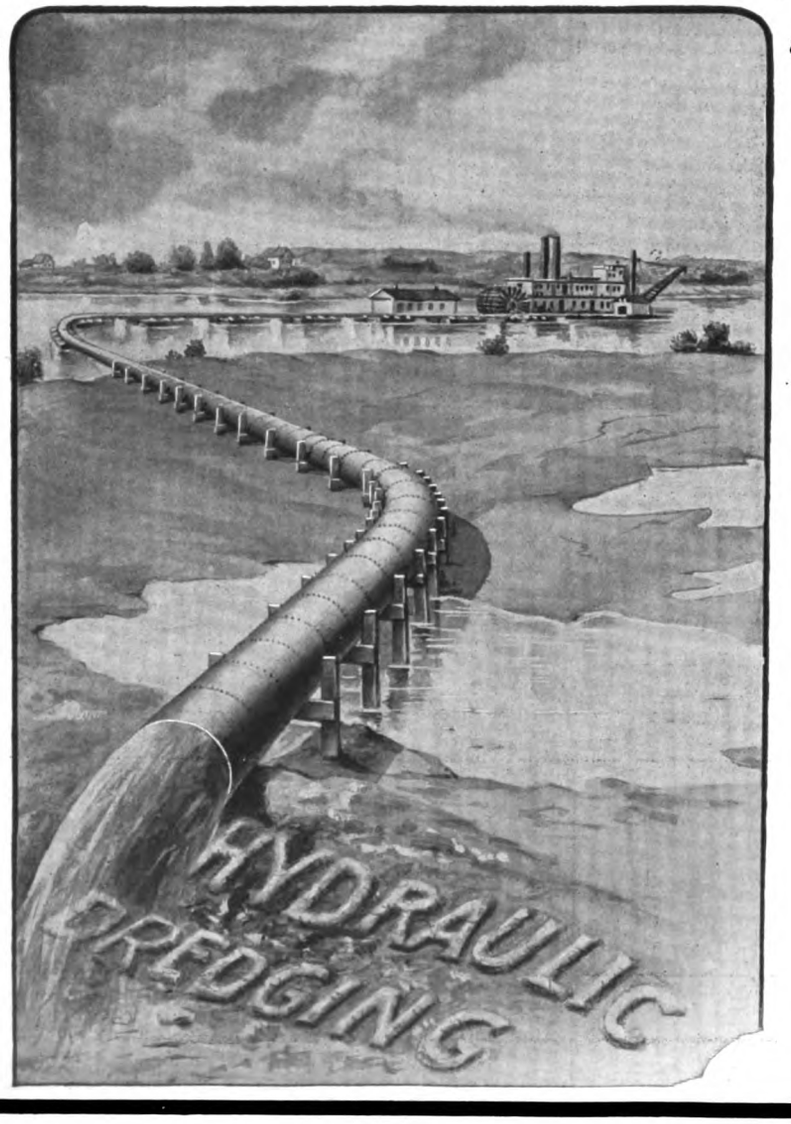
ANTONIO C. PESSANO, President and Gen. Mgr.

GEORGE H. RUSSEL, Vice President.

JOHN R. RUSSEL, Secretary-Treasurer.





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Floating Dock

Marine Engines

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NOW IN USE (MARCH, 1905)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

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English Royal Navy	966,300 "
Russian Imperial Navy	253,800 "
Japanese Imperial Navy	122,700 "
Austrian Imperial Navy	56,700 "
Italian Royal Navy	32,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Compagnie Generale Transatlantique	1,500 "
Total Horse Power of Boilers in Use	1,939,660

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CAPITAL: 6,000,000 FRANCS

Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France.

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ASHTON

Cam Lever Pop Safety Valves and Non-Corrosive Steam Gauges.

give highest efficiency and durability. Specify them and get the best.

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Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug. .....New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

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Bowers, L. M. & Co.....Binghamton, N. Y.
Seaboard Steel Casting Co.....Chester, Pa.

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Holzapfel's American Composition Co....
.....New York.

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Cramp, Wm. & Sons.....Philadelphia.

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Detroit Ship Building Co.....Detroit
Great Lakes Engineering Works.....Detroit
Sturtevant, B. F., Co.....Hyde Park, Mass.

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Great Lakes Engineering Works.....Detroit.

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Gilchrist, Albert J.....Cleveland.
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Hoyt, Dustin & Kelley.....Cleveland.
Jenkins, Russell & Eichelberger....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
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Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland

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Detroit Ship Building Co.....Detroit.
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.....New York.
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Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.

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Sullivan, M.....Detroit.

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Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
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General Electric Co.....Schenectady, N. Y.

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Mietz, Aug. .....New York.
Sturtevant, B. F. & Co.....Hyde Park, Mass.
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WANTED and FOR SALE Department.

PROPOSALS.

U. S. Engineer Office, Duluth, Minn., May 27, 1905.—Sealed proposals for pile dike and riprap at Grand Marais, Mich., will be received here until noon, June 26, 1905, and then publicly opened. Information on application. CHAS. L. POTTER, Major, Engrs. June 22

U. S. Engineer Office, Duluth, Minn., May 27, 1905.—Sealed proposals for dredging about 117,000 yards in Portage Lake Ship Canals, Keweenaw Point, Michigan, will be received here until noon, June 27, 19051, and then publicly opened. Information on application. CHAS. L. POTTER, Major, Engrs. June 22

U. S. ENGINEER OFFICE, Montgomery, Ala., May 31, 1905. Sealed proposals for dredging "Link Channel," Apalachicola Bay, Fla., and Carrabelle Bar, Fla., will be received here until noon July 1, 1905, and then publicly opened. Information furnished on application. J. B. CAVANAUGH, Capt. Engrs. June 29

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For Sale.

Two 10 K. W. direct connected electric dynamos and engines, 125 volt, for marine work; good condition; cheap. JORDAN BROS., 74 Beekman St., New York.

Barge.

FOR SALE.—Small steam barge. For particulars, address Box 36, Manistique, Mich.

Dock Lease for Sale.

Long lease of valuable dock at Sault Ste. Marie, Mich. Will sell or rent for long or short term. F. R. Warner, Trustee, Sault Ste. Marie, Mich.

FOR SALE.

For Sale Cheap.

Beautiful model 37⅛ inches long, of passenger steamer City of Detroit. May be seen at D. & C. ticket office window, 28 Public Square, Cleveland. For photograph and full particulars, address R. J. Barrow, 102 Woodbridge avenue, Cleveland, Ohio.

Scotch Marine Boilers.

Four new, Scotch Marine Boilers, 10 ft. diameter and 11 ft. long. Will pass inspection for 200 lbs. working pressure. Quick delivery. Low price. Address B. M., care Marine Review, Cleveland.

The Steamer Gordon Campbell.

Burned on spar-deck—easy to cut down to lumber barge, to carry million feet. Machinery and boilers untouched. Hull untouched and in good condition. Boat in dry dock and thoroughly overhauled last summer. Can be seen in Chicago. Want best offer. Address Room 613, 59 Dearborn St., Chicago. t f

For Sale.

Tugs—One 18 x 18; one 14 x 16; one 10 x 12. Clam shell dredge with dipper arrangement. Machinery, iron work and equipment for 2½-yard dipper dredge. Machinery for clam shell dredge. Flat scow 112 x 32 x 9. Two 100-yard dump scows. Carkin, Stickney & Cram, Detroit, Mich.

FOR SALE.

Pumps and Engine For Sale.

We have two Worthington Duplex Pumps in good working order. One 18½ x 14¼ x 10 for $275, and one 14 x 7 x 10 for $175 net cash. We also have a double 6 x 6-inch non-condensing marine engine in good shape and ready to run. Price $150 net cash. THE HARDY & DISCHINGER CO., Oils and Supplies, Toledo, Ohio.

Marine Boiler.

For Sale.—One 50 H. P. Scotch Marine Boiler, 10 ft. long, 78 in. diameter, 160 lbs. steam pressure. Manufactured by Ritter & Co., Buffalo, N. Y. In first-class shape. For particulars, write The Detroit Stove Works, Detroit, Mich. t.f.

Patent on Valuable Nautical Invention.

A device in the form of an air buoy for definitely locating sunken vessels. Should the vessel sink upon which this buoy is placed, the buoy floats, and a line, made fast in a separate compartment, unreels until the vessel strikes bottom, thereby locating the exact position of the sunken vessel. This buoy is also adapted for use as a mooring buoy for yachts of all sizes, and for all floating property. It can be manufactured and sold for much less than any other buoy in use. Will sell the patent for cash or exchange for vessel or other property. Address, Capt. J. Fred Tribble, 59 Broadway, Norwich, Conn. t. f.

PRACTICAL SHIPBUILDING:

A Treatise on the Structural Design and Building of Modern Steel Vessels. The Work of Construction, from the Making of the Raw Material to the Equipped Vessel, including subsequent Upkeep and Repairs.

By A. CAMPBELL HOLMS,

Member of the Institution of Naval Architects and of the Institution of Engineers and Shipbuilders in Scotland; Surveyor to Lloyd's Register of Shipping. 2 vols. (Vol. I., Text. Medium 8vo. Vol. II., Diagrams and Illustrations. Oblong 4to.)

The plan of the book is briefly as follows: First, attention is given to the fundamental matters which govern the structural design; the various stresses to which the hull is exposed, their straining tendency, and the different structural designs by which the necessary strength to resist them may be secured. Secondly, each important part of the hull is considered by itself, and each one from three points of view viz., its purpose in the structure and the particular stresses and straining effects to which it is liable; the various formations adopted in its design, with the rules governing them as regards scantlings and strength; and a description of the actual work of making it in a shipyard and fitting it to the ship. As a description of the actual work of the shipyard is reading of a special character, it is dealt with separately in the second part of the book, the sequence generally being thus better preserved.

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Buyers' Directory of the Marine Trade.—*Continued.*

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bertram Engine Works Co., Ltd.....
.....Toronto, Can.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co....Quincy, Mass.
Great Lakes Engineering Works.Detroit, Mich.
Hall Bros.....Philadelphia.
Lockwood Mfg. Co.....East Boston, Mass.
Marine Iron Works.....Chicago.
Maryland Steel Co.....Sparrows Point, Md.
Mietz, Aug.....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Mich.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.

ENGINE TESTING.

Kreer & Parsons.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.....Chicago.
Kieley & Mueller.....New York.
Lunkenheimer Co. .....Cincinnati.
New York Belting & Packing Co..New York.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Kreer & Parsons.....Chicago.
Lovejoy, H. O.....Buffalo.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Roelker, H. B. .....New York.
Wood, W. J. .....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Hyde Park, Mass.

FEED WATER PURIFIERS AND HEATERS.

Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.
Ross Valve Co.....Troy, N. Y.

FIRE EXTINGUISHERS.

Safety Fire Extinguisher Co.....New York.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.

FORGES.

Sturtevant, B. F. Co.....Boston.
Sutton Co., C. E.....Toledo, O.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co...Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons.....Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co., B. F.....Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B. Toledo, O.

FUELING PLANTS, BUILDERS OF

Link Belt Machinery Co.....Chicago.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co..New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.
Georgian Bay Engineering Works.....
.....Midland, Ont.

GAUGES, STEAM AND VACUUM.

Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.

GAUGES, WATER.

Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co. .....Cincinnati, O.

GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J

GREASE EXTRACTORS.

Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.
Sutton Co., C. E.....Toledo, O.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
Chase Machine Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.
McMyler Mfg. Co.....Cleveland.
Marine Iron Co.....Bay City.
Mietz, Aug. .....New York.

HOLLOW SHAFTINGS, IRON OR STEEL.

Falls Hollow Staybolt Co...Cuyahoga Falls, O.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co...Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co..New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F..New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

IRON CASTINGS.

Sutton Co., C. E.....Toledo, O.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
.....Midland, Ont.
Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Winthrop Harbor, Ill.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Gaynor, T. F .....New York.
Kahnweiler's Sons, D.....New York.
National Cork Co.....Brooklyn.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson .....Buffalo.

LOGS.

Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

LUBRICATORS.

Crane Co.....Chicago.
Lunkenheimer Co. .....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
Hickler Bros.....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Hyde Park, Mass.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, Alexander .....Cleveland.
Kidd, Joseph .....Duluth, Minn.
Kreer & Parsons.....Chicago.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Wood, W. J. .....Chicago.

OAKUM.

Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.

Mietz, Aug. .....New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph..Jersey City, N. J.
Standard Oil Co.....Cleveland.

PACKING.

Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
New York Belting & Packing Co..New York.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co. .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

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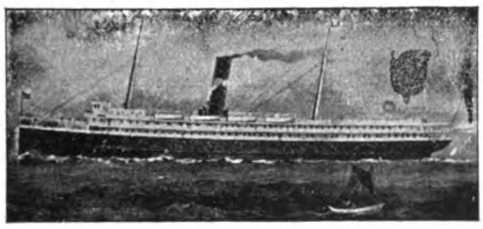

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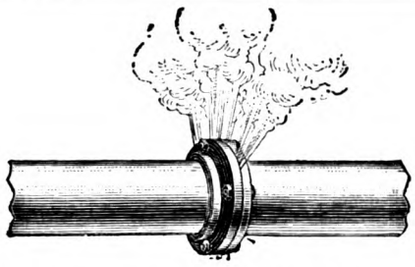

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III. Displacement and Centres of Buoyancy.
IV. Weights and Stowages.
V. Statical Stability.
VI. Gravity—Trim—Launching.
VII. Strength.
VIII. Tonnage—Freeboard—Corrosion and Fouling.
IX. Rudders—Horse-power—Propellers.
X. Curves—Coefficients—Approximations.
XI. Laying Off.
XII. Lloyd's and British Corporations.
XIII. Lloyd's Rules and B. C. Rules.
XIV. The Ship in Detail.
XV. Board of Education Examination Particulars.
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Buyers' Directory of the Marine Trade.—*Continued.*

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co. ..... Duluth, Minn.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M..... Detroit

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co.....Bath, Me.
Lockwood Mfg. Co. .....East Boston, Mass.
Marine Iron Works.....Chicago.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co..... .....Newport News, Va.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Marine Iron Works.....Chicago.
Kingsford Foundry & Machine Works.... .....Oswego, N. Y.

PUNCHES AND SHEARS.

Sutton Co., C. E.....Toledo, O.

RANGES.

Stamford Foundry Co.....Stamford, Conn.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)
Georgian Bay Engineering Works..... .....Midland, Ont.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.

Ashton Valve Co.....Boston.
Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.

SHAFTING, HOLLOW.

Falls Hollow Staybolt Co..Cuyahoga Falls, O.

SHEARS.

See Punches, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bertram Engine Works Co., Ltd.Toronto, Can.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co..... .....Newport News, Va.
New York Shipbuilding Co....Camden, N. J.
Roach's Ship Yard.....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.
Smith & Son, Abram.....Algonac, Mich.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Marine Mfg. & Supply Co.....New York.
Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, Joseph .....Duluth.
Kreer & Parsons .....Chicago.
Matteson & Drake .....Buffalo.
Rice & Lovejoy .....Buffalo.
Steel, Nacey & Hynd.....Cleveland.
Wood, W. J.....Chicago.

SHIP LANTERNS AND LAMPS.

Russell & Watson.....Buffalo.

SHIPMATE RANGES.

Stamford Foundry Co.....Stamford, Conn.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLT IRON OR STEEL BARS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co..Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.....Cleveland.
Holmes, Samuel .....New York.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
Anchor Line .....Buffalo.
Boston Steamship Co.....Boston.
Cleveland & Buffalo Transit Co.....Cleveland.
International Mercantile Marine Co..... ..... Philadelphia.
Mallory Line ....New York.
Merchants' Montreal Line.....Montreal.
New York & Cuba Mail S. S. Co...New York.
Red Star Line.....New York.
United Fruit Co.....Bostor

STEEL CASTINGS.

Otis Steel Co.....Cleveland.
Sutton Co., C. E.....Toledo, O.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.
Moulton Steering Engine Co.....New York.
Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
Schrader's Son, Inc., A..... ....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Lovejoy, H. O.....Buffalo.
Matteson & Drake .....Philadelphia.
Parker Bros. Co., Ltd.....Detroit.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
Lunkenheimer Co.....Cincinnati, O.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co..Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co..... .....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.

TRAPS, STEAM.

Kieley & Mueller .....New York.
Sturtevant Co., B. F.....Hyde Park, Mass.

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

Ashton Valve Co.....Boston.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co.....Troy, N. Y.

VALVES FOR WATER AND GAS.

Lunkenheimer Co.....Cincinnati.
Ross Valve Co.....Troy, N. Y.

VARNISHES.

Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co.....Hyde Park, Mass.
Sutton Co., C. E.....Toledo, O.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hall, John B.....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co.....Cleveland.
Lester, S. S. .....Quebec, Can.
McCarthy, T. R.....Montreal.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

VESSEL FURNISHINGS.

Williams & Rodgers Co.....Cleveland.

WATER GAUGES.

Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co.....Cincinnati, O.

WATERTIGHT BULKHEAD DOORS.

"Long Arm" System Co.....Cleveland.

WHISTLES, STEAM.

Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

WILFORD'S WATERPROOF CLOTH.

Bunker, E. A. .....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

WINDLASSES.

American Ship Windlass Co..Providence, R. I.
American Ship Building Co.....Cleveland.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

WINCHES.

American Ship Windlass Co..Providence, R. I.
Georgian Bay Engineering Works..... .....Midland, Ont.
Hyde Windlass Co.....Bath, Me.

WOOD PRESERVING PAINT.

Carbolineum Wood Preserving Co..Milwaukee.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..... .....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.

YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd..Toronto, Can.
Drein, Thos. & Son.....Wilmington, Del.
Georgian Bay Engineering Works..... .....Midland, Ont.
Truscott Boat Mfg. Co.....St. Joseph, Mich.

YACHT BROKERS.

Clapham & Clapham.....New York.

YAWLS.

Drein, Thos. & Son.....Wilmington, Del.

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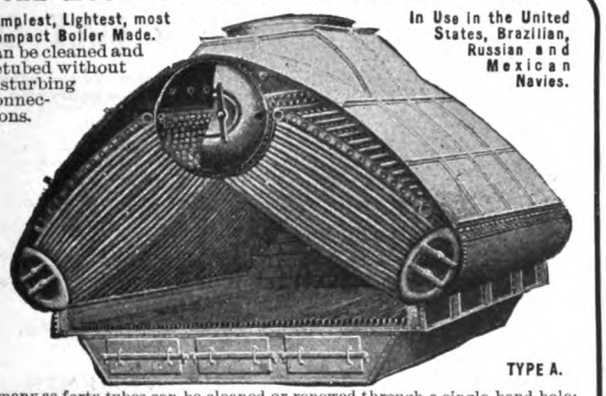

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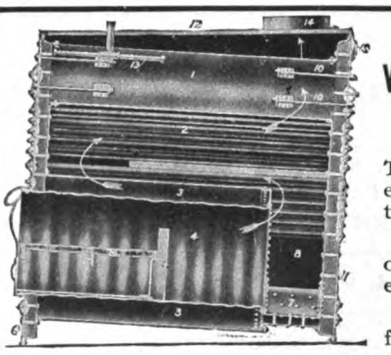

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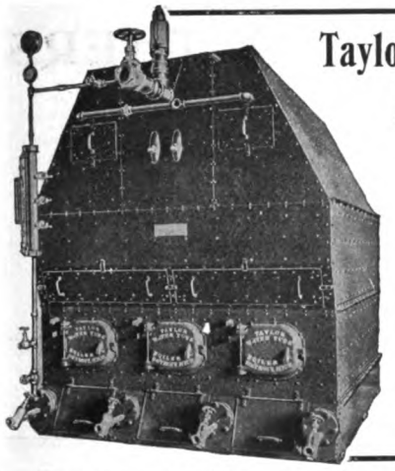

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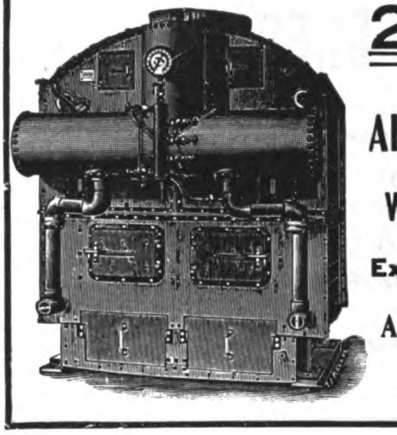

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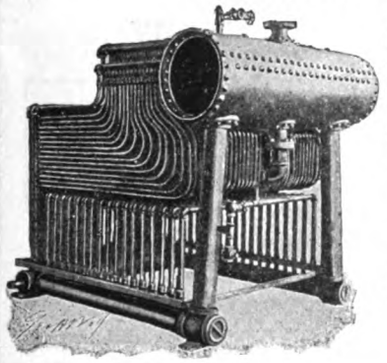

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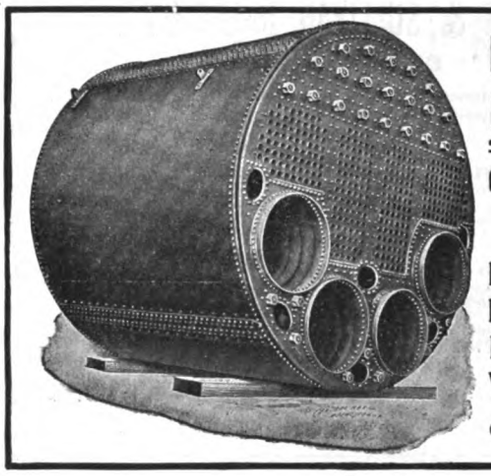

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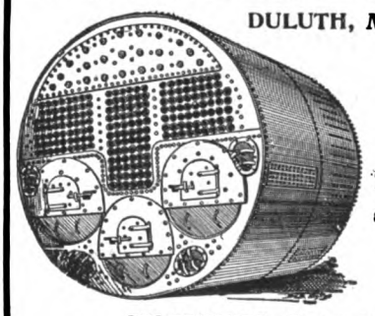

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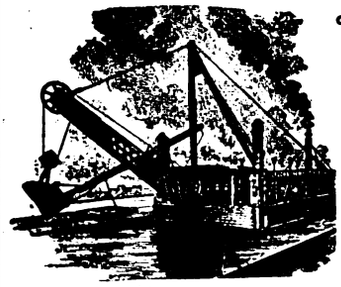

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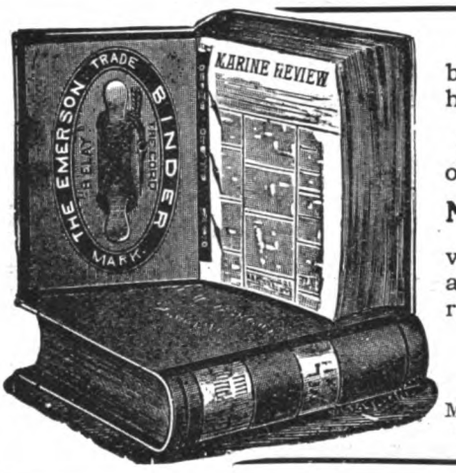

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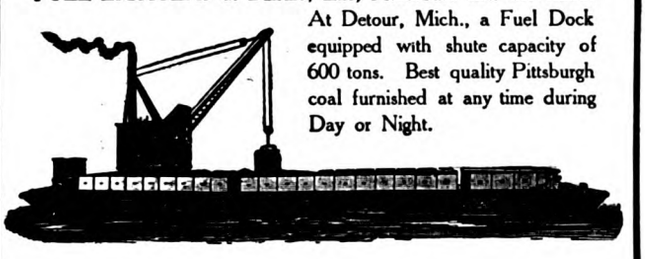

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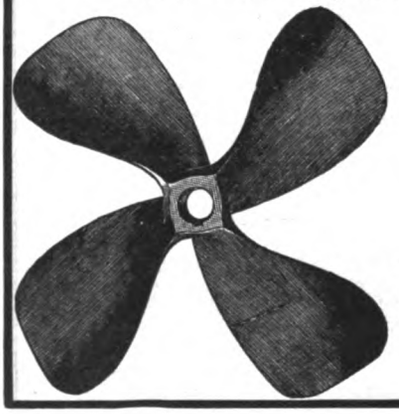

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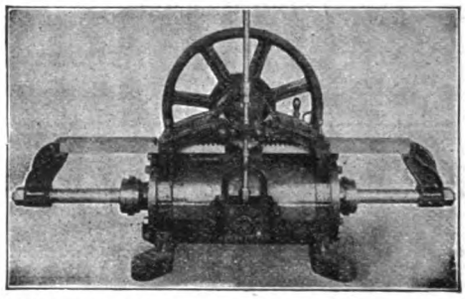

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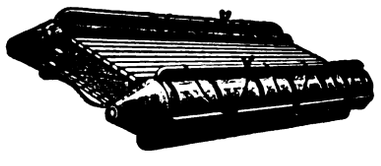

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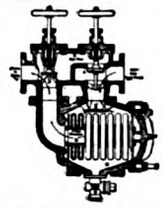

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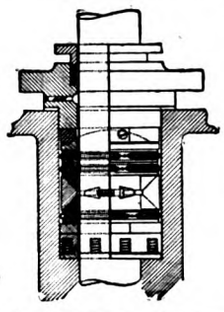

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No. 40, Toledo and Buffalo Accom	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
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No. 133, Cleveland and Detroit Exp.	.....	*12:45 p.m.
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No. 141, Sandusky Accommodation	.....	†3:10 p.m.
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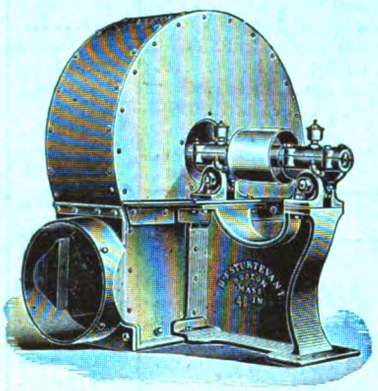

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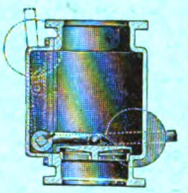

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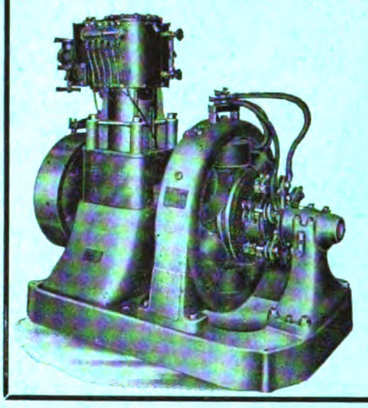

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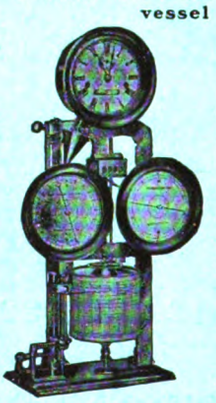

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